Control: For a given refrigeration circuit, current flows from the same transformer, to the same fuse block, then branches thru a separate fuse, flows thru the ON/OFF SWITCH for the WELL, thru the Pressure Switch for High Head Cutout, thru another Pressure Switch, thru the actuator coil of the respective Motor Starter, thru the Overload Cutout to ground. A Varistor shunts the coil. From the input to the Motor Starter, current branches thru the actuator coil of a Solenoid Valve which admits water for cooling the compressor.

Refrigeration Supply Circuitry, Particulars

Well	Trans-former	Fuse Block	Fuse	Amps	Motor Starter		Heater	Comp-ressor	HP
1α	E757	E510	E545	4	MS7	E557	E580	700	1/3
1β			E544	7	MS8	E558	E581	701	1/2
2	E758	E511	E548	7	MS9	E559	E582	702	1/2
3			E547	4	MS10	E560	E583	703	1/3

Refrigeration Control Circuitry, Particulars

Well	Fuse, Amps	ON|OFF SWITCH WELL #	Pres Sw, Setpoint (PSIG)	Pres Sw, Setpoint (PSIG)	Varistor	Solenoid Valve
1α	E543 8	E26 1	E748 220	E753 Γ	E787	E620
1β	E543 8	E26 1	E749 210	E754 Σ	E788	E621
2	E546 15	E27Φ 2	E750 210	- - - -	E789	E622
3	E546 15	E28Ω 3	E751 150	- - - -	E790	E623

α Low Stage, R-13.
β High Stage, R-502.
Γ Anti-Cavitation Interlock: 5" Hg Vac Open; 5 PSIG Close.
Σ High-Stage Enabler: 100 PSIG Open; 130 PSIG Close.
Φ Poled separately from the circuit which supplies Controller (E55).
Ω Poled separately from the circuit which supplies Controller (E56).

5-7-5 MAINTENANCE SUPPLY

For Safety, shut off all main power during maintenance. This circuit supplies power to work lights under such conditions.

From the facility, 115 V, 1 Ph, 60 Hz, 0.2 KVA connects to wires 105 and 106 inside Interconnection Enclosure (E742) mounted inside the test stand. Current flows thru INTERIOR LIGHTS Switch (E800), in parallel thru Incandescent Lamps (E631 and E632) to wire 106.

INTERIOR LIGHTS Switch (E800) turns on/shuts off the Lamps. Incandescent Lamps (E631 and E632) illuminate the interior of the test stand.

5-7-6 SYSTEM 10 DATA ACQUISITION SYSTEM

Operation of the test stand requires acquisition of data and control of parameters pertaining to operating conditions. The Daytronic System 10 Datapac interfaces with devices which monitor pressure, flow, temperature, and speed; it integrates the data and actuates the stand's components for control of those parameters.

The following sections describe the various electronic circuit boards of the System 10:

Board	Description
E64	8 Channel Thermocouple Interface Board. It acquires signals from Thermocouples T1 thru T7 (E641 thru E647), which are mounted in various locations in the pneumatic and hydraulic systems. The 8th channel is not used.
E65	Thermocouple output processor card. It works in conjunction with board (E64) to provide the required reference value signals.
E66	16 channel, digital logic input/output interface card. It supplies controlling signals to Solid State Relays (E660 and E661) which control bypass of the (low range, mid range) turbines in the main discharge circuit. The Solid State Relays are mounted to Module Board (E655) which receives its input voltage from 5 VDC Power Supply (E658).

Board	Description
E67 thru E71	Frequency Input boards. They receive signals from turbine flowmeters (E663 thru E667). The following table lists each board's respective flowmeter, circuit, and range:

Board	Flowmeter	Circuit	Range
E67	E665	Primary/PRV Metered Disch.	170-24,700 PPH
E68	E666	Secondary/PRV Bypass Disch.	170-24,700 PPH
E69	E663	Total Flow System (low)	3.4-47.5 PPH
E70	E664	Total Flow System (mid)	22-475 PPH
E71	E667	Total Flow System (high)	170-24,700 PPH

E72 thru E74	Enhanced 2 channel DC strain gauge interface cards. They receive DC voltage signals from Pressure Transducers (E684 thru E688).
E75 thru E80	2 channel DC strain gauge interface cards. They receive DC voltage signals from Pressure Transducers (E673 thru E683).

For paths of circuits which support these components, refer to the end of Section 5-7-2, under these headings: **Computer Equipment; Supply to Solid State Relays; Supply for Output of Solid State Relays;** and **Supply for Amplification of Turbine Flowmeters.**

SECTION VI

OPERATING INSTRUCTIONS

CAUTION

BEFORE OPERATING THE STAND FOR THE FIRST TIME, BE SURE THAT ALL INSTRUCTIONS IN SECTIONS 3-1-7 THROUGH 3-1-14 HAVE BEEN EXECUTED.

NOTE

The operating instructions provided are of a general nature. Actual test sequences depend on the specifications of the individual component. For testing a given component, refer to the applicable overhaul manual; Perform testing in conformance with the specifications.

6-1 GENERAL START-UP PROCEDURES

1. Start up the test stand in accordance with the procedures in section 3-1-13.

2. Place the component under test in the sink. Make required test interconnections as illustrated by the applicable component hook-up diagrams found in the back of this manual.

3. In the active circuits, position shutoff valves, pressure regulators, and other controls as required.

6-1-1 USE OF FUEL ACCESSORIES CIRCUITRY

4. If using the Fuel Accessories circuitry of the Stand, press the FA button of STAND CONTROL MODE Switch (E47).

5. Set required pneumatic pressure(s) as follows:

6. Set required discharge pressure(s), back pressure(s), and flow rate(s) using applicable controls.

7. When the fuel temperature has stabilized at 80°F, proceed with testing.

6-1-2 USE OF LOW FLOW FUEL SUPPLY

If using the Low Flow Fuel Supply, press HIGH PRESS/ LOW FLOW PUMP Switch (E16). Set details (41 thru 50) as required.

Set FUEL TEMPERATURE MODE Switch (E48) as required.

6-1-3 USE OF TRANSFER SOLENOID DC SUPPLY

If using the Transfer Solenoid DC Supply, turn DC POWER Switch (E84) to the ON position. Set VOLTS ADJUST Pot (E83) as required. From DC POWER Receptacle (E92), use the appropriate cable assemblies to interface with the component under test. Position SOLENOID and TRANSFER SOLENOID Switches (E85 and E86) as required.

6-1-4 USE OF THE TEMPERATURE SIMULATOR

1. If using the Temperature Simulator, press the TS button of STAND CONTROL MODE Switch (E47).

2. Needle Valves (110 thru 114) control flow of air to Agitators (105 thru 109) which circulate the immersion fluid inside Wells (#1 thru #5). Open the Needle Valves ½ turn.

3. On top of Lubricator (537), adjust the red plastic knob to provide lubrication of one drop per minute.

4. For each well, adjust the rate of agitation. Turn the respective Needle Valve until a slight ripple appears on the surface without splashing. If the agitator does not start, rapidly open and close the Needle Valve a few times. If necessary, turn the shaft by hand to start the agitator.

5. Activate Wells #1 thru #5 by pressing Switches (E26 thru E30).

6. Establish temperature setpoint for Controllers (E54 thru E58) by pressing the up or down arrows as required. The display for Wells #4 and #5 will flash until temperature comes within 10°F of setpoint.

7. Wait for the wells to reach setpoint. Adjust the level of fluid as required (See Section 3-1-10).

8. Perform testing as required.

6-1-5 NOTE:

On a daily basis, inspect the low temperature wells. At humid test sites, water is apt to condense on the cold surface of the well and the fluid. During testing, the agitator will mix the condensate into the test fluid; at rest, the water will puddle at the bottom of the well. Every day before startup, inspect the well; as necessary, open the appropriate valve until all the water drains away.

6-1-6

WARNING

Copper coils pass cooling water thru Wells #4 and #5. A steady flow of water will keep the coils at a moderate temperature. **If WATER CONTROL VALVEs (115 and 116) are turned OFF while the wells exceed 212°F, then the coils, too, will exceed 212°F. Under these conditions, introduction of water will cause immediate generation of steam. This steam will exert high pressure and possibly rupture the coils inside the wells. This danger is especially likely upon application of RAPID COOLING.**

To use the RAPID COOLING function **below 250°F,** apply as desired. To use the RAPID COOLING function **above 250°F,** apply RAPID COOLING in **Pulses.** Apply **Pulses** until temperature falls below 250°F, then apply steadily, as desired.

6-1-7

NOTE

Accessing the internal areas of the test well bench disrupts the vapor barrier which insulates the enclosure. Should it become necessary to remove any of the panels, follow these steps:

1. Bring all wells to room temperature. This step prevents the attraction of moisture.
2. Perform maintenance as required.
3. Reinstall all insulation in its original place.
4. Carefully restore the vapor barrier.

NOTE

Depending on the site, the temperature and pressure of cooling water will vary. This variance will affect the ability of the water to cool the compressors. If Compressors (700 thru 703, 572) suffer inadequate cooling, head pressure will exceed normal limits, and the Safety Interlocks [Pressure Switches (E748 thru E752)] will interrupt control power. The following table lists values measured during factory checkout; use the data to evaluate the running conditions pertaining to the site being used.

Well #	Setpt (°F)	Comp-ressor	Gas	Pressure (PSIG) Meas Suction	Meas Head	Normal Head	Water Valve
1	-80	700	R13	24	140	165-180	- -
		701	R502	15	180	165-180	721
2	0	702	R502	15	180	165-180	732
3	+60	703	R502	15	180	165-180	743
LoFlo Fuel	+80	572	R22	40	180	165-180	580

If the measured head pressure is too high, then more water is required; if the pressure is too low, then less water is required. On Water Valves (721, 732, 743, 580), turn the adjusting screw clockwise to admit more water.

NOTE: For Well #1, the low stage refrigerant is cooled by the high stage. First, adjust the high stage [Water Valve 721)].

6-2 NORMAL SHUTDOWN

6-2-1 NORMAL SHUTDOWN, SHORT TERM

Shutdown of the stand in this manner will ensure enduring high performance of the equipment.

1. Reduce fuel inlet pressure/flow to minimum and shut off pump(s) as follows:

   a. If using the high-pressure, high-flow supply, press the STOP button of BOOST PUMP Switch (E7).

3. Reduce pneumatic supply pressure(s) to ambient by adjusting applicable control as required.

4. Disconnect hook-up hoses and electrical harness from the test component and the test stand, as applicable.

NOTE

The TS button of STAND CONTROL MODE Switch (E47) interrupts the supply of power to the Temperature Simulator. The ON/OFF SWITCHes for the WELLs (E26 thru E30) maintain their continuity, even upon removal of supply power. If Switches (E26 thru E30) are left in the ON position, then surge current will energize **ALL** circuits simultaneously upon startup, thereby blowing the primary fuses. For the care of components, set Switches (E26 thru E30) in the OFF position for shutdown.

5. Using Valves (115 and 116), reduce the temperature of Wells #4 and #5 to ambient. Apply rapid cooling in the prescribed manner, then turn Valves (115 and 116) to the OFF position.

6. Needle Valves (110 thru 114) control the agitation of the wells. Leave them in their current position.

7. The refrigeration systems will give more reliable service if allowed to operate continuously. If the refrigeration system is to be shut down for only a few days, no special preparations are required. However, upon restarting the system, **always** check for leaks.

8. Press the PURGE BLOWER OFF Switch (E11) to shut off stand control power.

9. Push in any number of EMERGENCY STOP Valves (62 & 63).

6-2-2 NORMAL SHUTDOWN, EXTENDED

1. Refer to Section 6-2-1; perform step 1 thru 7.

2. Execute tasks described in Sections 3-2-1 thru 3-2-4 ('Pumping Down').

3. Press the PURGE BLOWER OFF Switch (E11) to shut off stand control power.

4. Push in any number of EMERGENCY STOP Valves (62 and 63).

5. Close the following service shutoff valves: shop air (510), and high-pressure air (509).

6. Open the disconnects to shut off power to the stand, if desired.

6-3 EMERGENCY SHUTDOWN PROCEDURE

In an emergency, press either EMERGENCY STOP Valve (62 or 63). This action will shut down the stand immediately and safely.

Since this action will leave the stand in a pressurized state, it is not recommended for normal shutdown.

Upon any emergency, press either EMERGENCY STOP Valve (62 or 63). After attending to the emergency, execute the steps for normal shutdown as in Section 6-2-1 above.

6-4 COMPONENT TEST REQUIREMENTS

This manual does not provide component test requirements. Component testing must be performed in accordance with the procedures provided in the applicable overhaul manual.

SECTION VII
TROUBLESHOOTING

7-1 GENERAL

This information is presented as a guide for locating and correcting troubles encountered with the test stand. The troubles listed here are those which occur as a result of normal wear or operational oversight. It is hoped the this trouble-shooting guide will provide quick solutions to these problems so that there will be little loss in operational time.

WARNING
SHUT OFF ALL SERVICES TO THE TEST STAND BEFORE PERFORMING ANY MAINTENANCE OR SERVICING TO THE TEST STAND. FAILURE TO DO SO COULD CAUSE SERIOUS INJURY AND POSSIBLY DEATH.

7-2 TROUBLESHOOTING GUIDE

NOTE: For Each trouble, correct the cause before restarting the stand.

Trouble	Probable Cause	Remedy
Test stand control power will not come on or shuts off during operation.	Interruption in supply of power from the facility.	Ensure closure of main disconnect switch.
	Fuses (E516-E517) blown.	Check fuse; determine cause of problem; replace fuses.
	Purge time delay relay TDR2 (E585) defective.	Repair or replace applicable relay.

Trouble	Probable Cause	Remedy
Test stand control power will not come on or shuts off during operation.	One or more safety interlocks open. Investigate conditions; correct as necessary.	
	Shop air pressure below 60 PSIG.	Correct supply of shop air from facility. Open Shutoff Valve (510). Pull Emergency Stops (62 & 63). Replace elements, Filters (534 & 535); clear drain.
	Inside Instruments Enclosures, temperature > 140°F.	Replace Fuses (E552-E554). Clear air ducts of Blower (E638). Service the motor.
	Inside Instruments Enclosures, pressure < 0.12" H_2O.	Same as above.
	Shop water pressure below 10 PSIG.	Correct supply of shop water from the facility. Open Valve (590). Service Valve (590). Clear Strainer (592).
	Fuel temperature > 200°F.	Service Valve (571), Transducer (E633). Set Controller (E53); calibrate using RTD (E760).
	Reservoir below ½ Full.	Fill Reservoir (598).
	Inside Reservoir (598), temperature > 97°F.	Correct backpressure in component under test.
	Boost Pressure below 5 PSIG.	Open Shutoff Valve (599). Clear Strainers (600 & 604) and Heat Exchanger (594) per commercial literature. Service Boost Pump (602).

Trouble	Probable Cause	Remedy

NOTE: For each motor, proper operation depends on the function of several components. For each component cited, investigate the condition, then repair or replace as necessary. For each trouble, correct the cause before restarting the stand. If the Overload Cutouts open, reset them at the Motor Starter inside REMOTE SWITCHGEAR ENCLOSURE (E739).

Trouble	Probable Cause	Remedy
Instr. Purge Blower (E638) will not run.	Fuses (E522-E524) blown.	Replace Fuses.
	Overload Cutouts MS1 open.	Reset.
	Motor Starter MS1 (E552) defective.	Repair/Replace MS1.
Exhaust blower (E637) will not run.	Fuses (E518-E520) blown.	Replace Fuses.
	Overload Cutouts MS2 open.	Reset.
	Motor Starter MS2 (E551) defective.	Repair/Replace MS2.
Boost Pump (602) will not run.	Fuses (E525-E527) blown.	Replace Fuses.
	Overload Cutouts MS3 open.	Reset.
	Motor Starter MS3 (E554) defective.	Repair/Replace MS3.
	Shop Water below 10 PSIG; Reservoir below ½ Full; Reservoir over 97°F.	Correct as above.
High Pres. Pump (E744) will not run.	Fuses (E528-E530) blown.	Replace Fuses.
	Overload Cutouts MS4 open.	Reset.
	Motor Starter MS4 (E556) defective.	Repair/Replace MS4.
	Boost Pump (602) OFF.	Energize Boost Pump (602)
	Boost Pressure below 5 PSIG.	Correct as above.

Trouble	Probable Cause	Remedy
Low Flow Supply Pump (E745) will not run.	Fuses (E531-E533) blown.	Replace Fuses.
	Overload Cutouts MS5 open.	Reset.
	Motor Starter MS5 (E555) defective.	Repair/Replace MS5.
	Shop Water below 10 PSIG; Reservoir below ½ Full; Reservoir over 97°F; Fuel temperature > 200°F.	Cor- rect as above.
Compressor (572) for for refrig. low flow supply will not run.	Fuses (E534-E536) blown.	Replace Fuses.
	Overload Cutouts MS6 open.	Reset.
	Motor Starter MS6 (E553) defective.	Repair/Replace MS6.
	Shop Water below 10 PSIG; Reservoir below ½ Full; Reservoir over 97°F; Fuel temperature > 200°F.	Cor- rect as above.
	Head Pressure >200 PSIG.	See the table in Section 6-1-8; proceed as directed.
	FUEL TEMP CONTROLLER (E53) improperly set or defective.	Refer to Commercial Literature.
	Switch (E48) defective.	Replace Switch.

Trouble	Probable Cause	Remedy
Temperature of High Flow Supply erratic.	Temperature sensing bulb or capillary tube of temperature transmitter (618) damaged.	Check condition of bulb and capillary, and replace if damaged.
	Water control valve (595) inoperative.	Repair or replace valve.
	Heat exchanger (594) clogged.	Service per recommendations given in commercial literature.
	Insufficient supply of air to Controller (812).	Adjust Regulator (808) until Gage (810) displays 20 PSIG.
	Malfunction of Controller (812).	Service per Commercial Literature.
Temperature of Low Flow Supply erratic.	RTD (E760) damaged.	Check condition. Repair/Replace.
	Water Valve (580) inoperative.	Repair/replace.
	Heat Exchanger (562 or 563) clogged.	Service per Commercial Literature.
	Valves (585 thru 588, E629) inoperative.	Service per Commercial Literature.
	Current-to-Pressure transducer (E633) defective.	Repair/Replace.
	Valve (571) inoperative.	Repair/Replace.
	Heat Exchanger (561) clogged.	Service per Commercial Literature.
	Insufficient supply of steam.	Correct supply of steam from facility. Clear Strainer (567). Service Valves (568, E626). Set Regulator (569) so Gage (803) reads 40-50 PSIG.
	System 10 defect.	See heading below, relevant to System 10.

Also, see below: troubles relating to refrigeration systems.

Trouble	Probable Cause	Remedy
Discharge system turbine meters switching erratically or not switching.	System 10 software altered.	Check all statements against the System 10 setup, found in the System 10 memory map, Section 9-9.
	Turbine linearizing functions inadvertently destroyed or altered.	Upload linearizing functions and statements from the disk to EEPROM. Check system for proper operation.
	Erratic I/O board.	Replace I/O board.
	Conditioner boards mistyped or faulty.	Check type (TYP), location (LCT), and EMM Term (EMM) functions of the frequency input. Replace a faulty board.
	Turbine defective.	Replace Turbine. Enter turbine data into System 10 using Linpac software.

Trouble	Probable Cause	Remedy
Refrigeration Components, Temperature Simulator		
Absence of all power	Shop air below 60 PSIG; Purge Temp. > 140°F; Purge Pres. < 0.12" H2O	Correct as above.
	Delay Relay TDR2 (E585) defective.	Repair/replace.
	Switch (E47) inoperative.	Replace Switch.
	Contactor K1 (E561) defective.	Repair/replace.
No control power to individual well.	Fuses (E537-E541, E543 E546 E549 E550) blown.	Replace fuses.
Well #1, low stage: no control power	Overload Cutouts MS7 open.	Reset.
	Motor Starter MS7 (E557) defective.	Repair/Replace MS7.
	High Head pressure.	See Sect. 6-1-8
	Low suction pressure; Low charge. Valve (714) icy and stuck.	See Section VIII.
Well #1, high stage: no control power	Overload Cutouts MS8 open.	Reset.
	Motor Starter MS8 (E558) defective.	Repair/Replace MS8.
	High Head pressure.	See Sect. 6-1-8.
	High Stage enabler open; Low Charge in low stage. Valve (725) icy and stuck.	See Section VIII.
Well #2: no control power	Overload Cutouts MS9 open.	Reset.
	Motor Starter MS9 (E559) defective.	Repair/Replace MS9.
	High Head pressure.	See Sect. 6-1-8.
Well #3: no control power	Overload Cutouts MS10 open.	Reset.
	Motor Starter MS10 (E560) defective.	Repair/Replace MS10.
	High Head pressure.	See Sect. 6-1-8.

Trouble	Probable Cause	Remedy
Individual Wells have control power, but no supply power.	Fuses (E544 E545 E547 E548) blown.	Replace fuses.
	Defective Motor Starter MS7-MS10 (E557-E560)	Repair/replace MS.
	Heaters (E580-E583) defective.	Replace Heater.
	Compressor (700 thru 703) inoperative.	Service the compressor.
At individual Wells, Controller (E54 thru E58) shuts off.	Overtemperature; Limit switches (E789 thru E793) open, various reasons:	
	Low charge. Valve (736, 747) icy and stuck.	See Section VIII.
	RTD (E761 thru E765) defective.	Check for continuity. Check for ground resistance. Replace as necessary.
	Controller defective.	Service per Commercial Literature.
Noisy Compressor	Inadequate lubricant.	Add lubricant as required.
Heating function of Wells inoperative.	Faulty Heaters (E766-E774) or supply circuit.	Replace heaters; service supply circuit.
Wells #4 & #5 not reaching high temp.	Valves (115 & 116) left in RAPID COOLING position.	Turn to OFF or CONTROL position.
Agitators not operating.	Inadequate supply.	Set Regulator (809) to supply 50 PSIG as displayed on Gage (811).
	Agitators binding.	Restore free motion by opening and closing Needle Valves (110 thru 114) a few times; turn shaft by hand if necessary. Service/replace motor as necessary.

SECTION VIII

PERIODIC INSPECTION AND MAINTENANCE

8-1 GENERAL

The following sections list inspection and maintenance procedures. Routine performance of the procedures will ensure enduring high performance of the equipment. Frequency of performance depends on the variables of test stand usage, environmental condition (cleanliness of air and water supplies, for example), and established shop maintenance programs; therefore, most time intervals are not provided.

Where time intervals are not specified, it is suggested that these procedures be initially performed once a week for the first three months of test stand operation and that a specific inspection and maintenance timetable be worked out based on the results observed during this time period. Where time intervals are provided, they are as specified by the component manufacturer or by Bauer Aerospace, Inc..

For specific procedures pertaining to the maintenance of components, refer to the commercial literature provided in a separate volume. The commercial literature is the sole source of authorized procedures; Bauer's warranty stipulates adherence to authorized procedures.

8-2 INSPECTION AND MAINTENANCE PROCEDURES, ALL SYSTEMS

1. Check the fluid in reservoir (598) for contamination and change as required. After draining the fluid, remove the reservoir covers and wipe out the inside with clean lint-free cloths to remove residue and debris.

2. Check the condition of the shop air filters (534 & 535); replace elements when dirty.

3. Check the condition of the high pressure air filter (523); replace the element when dirty.

4. Check the condition of the fuel system filters (555, 604 & 614) on the respective pressure gauges (806, 805, 807). Replace elements when necessary. After replacing an element, bleed air from the filter as required.

5. Check the oil level in lubricators (536 & 537). If low, remove oil filler cap from the top of the lubricator and add SAE 10W oil until filled.

6. Every six months, remove the screens from strainers for water inlet, boost supply, low flow supply, and high pressure air; flush screens to remove foreign material.

7. The boost pump motor, high pressure pump motor, and low flow supply pump motor may require periodic lubrication. Refer to the manufacturer's commercial literature for recommended lubrication intervals, procedures, and type and quantity of lubricant.

8. Perform required calibrations (see Section IX).

9. With the test stand operating, inspect all hydraulic pneumatic, and water lines for signs of leakage. Tighten connections where necessary. Replace worn parts and hoses.

10. <u>OPEN THE MAIN DISCONNECT SWITCH</u>. Then, inspect all components and wiring inside the main switchgear enclosure, and the air-purged enclosures for security of attachment and signs of arcing. Clean and tighten where necessary.

8-3 LUBRICATION OF COMPRESSORS

Under proper maintenance, the oil inside Compressors (572, 700 thru 703) will provide adequate lubrication for several years. If moisture enters the system, it will be necessary to change the oil in the affected compressor. Refer to the manufacturer's commercial literature provided with this manual for details on changing the oil and checking the oil level. The motors which drive the compressors require no separate lubrication.

NOTE

If there is a shortage of refrigerant or a faulty expansion valve, oil may leave a compressor and settle in the evaporator coil. To add oil in this situation would be undesirable. Therefore, before adding oil, check the Sight Glasses (582, 712, 723, 734, 745) for adequacy of refrigerant charge; check that Expansion Valves (584, 714, 725, 736, 747) are properly flooding the coil. Add refrigerant and service expansion valves as necessary. Then, check the oil level again.

If oil must be added, use only Sun Oil Col-322 (4GS300) 150 viscosity or equivalent. Add the right amount of oil. An excess of oil will increase oil pumping, reduce refrigeration, and increase current draw. After adding oil, run the compressors for about an hour and then recheck the oil levels.

8-4 LUBRICATION OF OTHER COMPONENTS

1. Agitators See Section 3-1-11.

8-5 CONDENSATION FROM THE AIR

On a daily basis, inspect the low temperature wells. At humid test sites, water is apt to condense on the cold surface of the well and the fluid. During testing, the agitator will mix the condensate into the test fluid; at rest, the water will puddle at the bottom of the well. Every day before startup, inspect the well; as necessary, open the appropriate valve until all the water drains away.

8-6 LEVEL OF IMMERSION FLUID

For maximum performance of the five test wells, check the level of immersion fluid at the start of each working day. Fill with the proper fluid as described below.

Consider Well #1. Lift the lid and identify the screen which keeps test components away from the agitator. Note the horizontal bar which holds the screen.

Test Wells #1, #2, #3: Fill to a level 1/2" below the bar.

Test Wells #4, #5: These wells operate at high temperatures which will cause expansion of the immersion fluid. For Wells #4 & #5, fill to a level 1" below the bar.

No. of Well	Dow Corning Fluid Type	Dow Corning Fluid Viscosity(cs)
1	200	2
2	200	2
3	200	20
4	200	20
5	550	125

NOTE

These are the fluids recommended by the manufacturer. Other fluids will possibly damage insulation and electrical components. Bauer's warranty stipulates use of recommended fluids.

8-7 USE OF HALOGEN STYLE LEAK DETECTOR

NOTE: This is the only style of leak detector recommended.

The leak detector beeps loudly upon contact with any of the refrigerants used in the systems of this stand. Freon released in purging must be thoroughly blown away before checking for leaks. To detect small leaks, set the sensitivity at a moderate, not high, level. A trained mechanic can detect a leak so small that it would require several years to lose a pound of refrigerant.

Keep the end of the rubber tube clean and free of oil. Pass the pick-up tube very slowly around the entire area suspected. Since Freon is heavier than air, first check the area just below the area of the suspicion. Leaks occur most commonly at flare fittings, solder joints, and bends in tubing or gaskets; all such leaks are easily repaired.

8-8 REFRIGERANT CHARGE

8-8-1 GENERAL, AND SINGLE STAGE SYSTEMS

Assessment: Maximum performance of each refrigeration circuit requires an optimum refrigerant charge. Any appreciable variation from this charge will affect performance adversely. The correct charge is that quantity of refrigerant which will flood the evaporator coil, and at the same time will fill the sight glass in the liquid line when operating at the normal temperature requirement.

Adding Refrigerant: Typically, refrigerant is lost as a result of leaks, or excess purging. To add Freon, follow these steps:

NOTE:

For charging the R-13 System, see also Section 8-8-2

1. Make certain that all lines and fittings, as well as the Freon to be added, are dry and clean. The slightest amount of moisture will cause a freeze-up of the expansion valve. Take great care to keep air out of the system.

2. At the low (suction) side of the compressor, refrigerant exerts pressure below ambient. Before removing the cap for the service valve, backseat the valve to prevent the entry of air and moisture.

3. Set the Freon container in an upright position. In this way, not liquid, but gas will flow into the system; Use of gas provides control of charge being added.

4. Use a charging hose which features a gage set. Always purge the charging line as follows: At the Freon container, connect to the charging hose and tighten the flare nut. At the compressor, on the suction side, at the service port, connect the other end, but leave the flare nut loose. At the Freon container, slightly open the supply valve; refrigerant will vent to the atmosphere briefly. At the compressor, tighten the flare nut.

5. Open the valve on the Freon container. Start the compressor. Screw in the stem of the suction valve ½ to 1 turn. Charge will enter the system slowly. Observe the Sight Glass; at full charge, it will become clear of bubbles. Observe the Freon container and the charging line; if they collect dew or frost, heat them with hot water while charging.

6. Add refrigerant until the charge is correct. Before disconnecting the charging line, shut off the compressor. Wait for the connections to reach ambient temperature. Dry the connections. Then, backseat the service valve and disconnect the charging line. Replace caps on all valves and service ports; tighten securely.

7. Check all connections for leaks with a Halogen Style Leak Detector.

8-8-2 RECHARGING R-13 SYSTEM, SPECIAL CONSIDERATIONS

R-13 is designed for use at low temperatures. At ambient temperatures, this gas exerts very high pressures. The amount of charge is critical. Overcharging is very undesirable.

WARNING

CHARGE THE R13 SYSTEM VERY SLOWLY AND CAREFULLY. OVERCHARGING WILL LEAD TO PRESSURES IN EXCESS OF 250 PSIG. AT THESE HIGH PRESSURES, GAS WILL BE LOST THRU RELIEF VALVE (709).

NOTE: Relief Valve (709) will open correctly to vent excess pressure. However, it will probably leak even after reduction in pressure. In this case, replacement of the valve, complete purging and recharging of the system would be necessary. Therefore, avoid down time by charging carefully.

1. Bring the system to ambient temperature.

2. Use hoses which feature service gages. At the compressor, connect the suction port to the supply of Freon; connect the head port to a service gage. Purge them as described in the previous section.

3. Turn the compressor off. Slowly open the supply valve. Allow R13 refrigerant to flow into the system. When the head pressure gage reads 200 PSIG, close the supply valve. The system is now charged.

For this R13 system, optimum charge is small. During normal operation, Sight Glass (712) will show only ¼ to ½ full. A full level in the sight glass would constitute overcharge. Read the Warning above.

If moisture enters the system, evacuate it with a vacuum pump for a minimum of 12 hours. Then, fill the system with dry nitrogen and evacuate; preferably, fill a second time and evacuate again. Then, the system is ready to be recharged.

8-9 REPLACING REFRIGERATION COMPONENTS

To replace a refrigeration component, isolate it from the rest of the system. As necessary, refer to Section 3-2 and pump down the system. Turn off the compressor. Close valves on both sides, nearest the component. Take special care to prevent loss of Freon, entry of air, and entry of moisture. Work as quickly as possible when disconnecting and reconnecting fittings, when removing and replacing sealing caps. Always purge the new component upon installation, before restarting the system. Start up the system and check the refrigerant charge.

8-10 EXPANSION VALVES

Proper operation depends on the performance of Expansion Valves (584, 714, 725, 736, 747). Normally, upon shutdown, they will close. If the needle or seat is faulty, liquid refrigerant will leak into the suction line. Upon restarting, this situation will cause frosting of the suction line. If the trouble is severe, the compressor will knock.

If frosting or knocking is observed, check the refrigerant charge. Shut the system down, then restart. If knocking or frosting persists, remove the expansion valve. Repair or replace as necessary.

SECTION IX
CALIBRATION

9-1 GENERAL

Calibrate the instruments of the test stand regularly in order to ensure reliable test results.

9-2 TEMPERATURE CONTROLLERS

Temperature Controllers (E53 thru E58) may require periodic calibration. Refer to the manufacturer's commercial literature for the proper procedures.

9-3 REPLACEMENT OF COMPONENTS

Typically, test sites do not carry calibration equipment capable of duplicating the precision of the manufacturer. Moreover, fault commonly stems from internal failure. Therefore, concerning the calibration of the precision instruments, Bauer recommends the return of them to the Vendor. Faults in mechanical components or electrical circuits are still field seviceable.

9-4 TEMPERATURE CONTROLLER CONFIGURATION

The following sheets present settings for the configuration of Temperature Controllers (E53 thru E58). Re-enter the settings upon installation of a new controller, or the return of a repaired one.

NOTE: Each controller has its own peculiar set of configuration codes. When re-entering, be sure to use the set of configuration codes which pertains to the given controller. For the proper procedures, turn to the commercial literature section of this manual, and refer to the Eurotherm Manufacturer's Installation and Operation Manual.

CONTROLLER CONFIGURATION

Eurotherm Model 808 Temperature Controller Tuning Constants

Job # 9513 | Model # 1276001 | Date 16 Apr 90

Controller # E53 | Low Flow Fuel Circuit | Setpoint 160.0°F

-5.0°F

Tune	OFF	HPL	100.0
HiAL	200.0	SNBP	0.0
LoAL	-20.0	OFFSET	0.0
d AL	500.0	CF	F
PROP	120.0	SN	RTD3
INT.T	114	ADDR	0.0
d ER.T	6	BAUD	9600
		IDNO	0
		CTRL	PID
		OP1	4-20
SP.H	160.0	OP2	ON
SP.L	-5.0	A H	AUTO
H AO	OFF	Pb d	C-F
L AO	OFF	E Su	NO
D AO	OFF	Cb O	AUTO

Eurotherm Model 808 Temperature Controller Tuning Constants

Job # 9513 Model # 1276001 Date 16 Apr 90

Controller # E54 Well # 1 Setpoint -80.0°F

R-502 Suction 15 PSIG R-13 Suction 22 PSIG

R-502 Head 180 PSIG R-13 Head 130 PSIG

Tune	OFF	HPL	100.0
HiAL	750.0	SNBP	0.0
LoAL	-99.9	OFFSET	A/R
d AL	900.0	CF	F
PROP	3.0	SN	RTD3
INT.T	100	ADDR	0.0
d ER.T	20	BAUD	9600
H CT	1.0	IDNO	0
Hc B	3.0	CTRL	PID
Lc B	3.0	OP1	PF6
SP.H	70.0	OP2	OFF
SP.L	-80.0	A H	AUTO
H AO	OFF	Pb d	C-F
L AO	OFF	TSU	NO
D AO	OFF	Cb O	HAND

CONTROLLER CONFIGURATION

Eurotherm Model 808 Temperature Controller Tuning Constants

Job # 9513 Model # 1276001 Date 16 Apr 90

Controller # E55 Well # 2 Setpoint 0.0°F

R-502 Suction 6 PSIG

R-502 Head 175 PSIG

Tune	OFF	HPL	100.0
HiAL	750.0	SNBP	0.0
LoAL	-99.9	OFFSET	-0.5
d AL	900.0	CF	F
PROP	4.0	SN	RTD3
INT.T	250	ADDR	0.0
d ER.T	20	BAUD	9600
H CT	0.5	IDNO	0
Hc B	6.0	CTRL	PID
Lc B	6.0	OP1	PF6
SP.H	80.0	OP2	OFF
SP.L	0.0	A H	AUTO
H AO	OFF	Pb d	C-F
L AO	OFF	TSU	NO
D AO	OFF	Cb O	HAND

CONTROLLER CONFIGURATION

Eurotherm Model 808 Temperature Controller Tuning Constants

Job # 9513 Model # 1276001 Date 16 Apr 90

Controller # E56 Well # 3 Setpoint +60.0°F

R-502 Suction 6 PSIG

R-502 Head 175 PSIG

Tune	OFF	HPL	100.0
HiAL	750.0	SNBP	0.0
LoAL	-99.9	OFFSET	0.2
d AL	900.0	CF	F
PROP	2.5	SN	RTD3
INT.T	150	ADDR	0.0
d ER.T	20	BAUD	9600
H CT	0.5	IDNO	0
Hc B	5.0	CTRL	PID
Lc B	5.0	OP1	PF6
SP.H	150.0	OP2	OFF
SP.L	5.0	A H	AUTO
H AO	OFF	Pb d	C-F
L AO	OFF	TSU	NO
D AO	OFF	Cb O	HAND

CONTROLLER CONFIGURATION

Eurotherm Model 808 Temperature Controller Tuning Constants

Job # 9513 Model # 1276001 Date 16 Apr 90

Controller # E57 Well # 4 Setpoint +155.0°F

Tune	OFF	HPL	100.0
HiAL	750.0	SNBP	0.0
LoAL	-99.9	OFFSET	0.10
d AL	10.0	CF	F
PROP	6.0	SN	RTD3
INT.T	300	ADDR	0.0
d ER.T	30	BAUD	9600
H CT	1.0	IDNO	0
Hc B	5.0	CTRL	PID
Lc B	5.0	OP1	PF6
SP.H	200.0	OP2	OFF
SP.L	70.0	A H	AUTO
H AO	OFF	Pb d	C-F
L AO	OFF	TSU	NO
D AO	NLAT	Cb O	HAND

Eurotherm Model 808 Temperature Controller Tuning Constants

Job # 9513 Model # 1276001 Date 16 Apr 90

Controller # E58 Well # 5 Setpoint +220.0°F

Tune	OFF	HPL	100.0
HiAL	750.0	SNBP	0.0
LoAL	-99.9	OFFSET	0.0
d AL	10.0	CF	F
PROP	6.0	SN	RTD3
INT.T	250	ADDR	0.0
d ER.T	20	BAUD	9600
H CT	1.0	IDNO	0
Hc B	5.0	CTRL	PID
Lc B	5.0	OP1	PF6
SP.H	400.0	OP2	OFF
SP.L	70.0	A H	AUTO
H AO	OFF	Pb d	C-F
L AO	OFF	TSU	NO
D AO	NLAT	Cb O	HAND

9-6 PRESSURE GAUGES AND TRANSDUCERS

It is recommended that the accuracy of a pressure gage or transducer be checked as follows:

* whenever the reading of the device is questioned;
* at least once a month;
* whenever it fails to read zero upon removal of the load.

Note: the gages are supplied with a zero adjust which compensates the overall scale reading for reference shift; the zero adjust does not govern the span precision or the ability of the gage to repeat. Should the gage become defective as a result of use or abuse, then replace it with a properly calibrated gage of the same type and range.

Use a hydraulic deadweight tester or approved device whose precision is at least twice that of the gage/transducer to be calibrated.

To calibrate the gage/transducer, consult the applicable calibration page on the System 10. Calibrate directly thru the sink ports.

9-7 TURBINE FLOWMETERS

The calibration of turbine flowmeters (E663 thru E667) must be checked once a year. A weight flow calibration stand is required to check the accuracy of the turbines. The weight flow stand must be capable of supplying temperature-controlled MIL-C-7024C, Type II calibration fluid over the full metering range of the turbines,and must provide measurement accuracy of ±0.2% or better. In order to avoid applying a temperature correction factor to measurement values, the turbines must be calibrated with the fluid maintained at the original calibration temperature shown on their calibration certificates, found in the manufacturer's commercial literature.

Calibration of the turbines consists of making weight flow measurements at the same test point frequencies that are shown on the turbine's calibration certificates, and comparing the measurements against the specified calibrated flows.

If a weight flow stand having the required range and accuracy is not available, the turbines can be returned to the manufacturer for recertification.

Each time calibration data is received with a new or recalibrated turbine meter, the data must be entered into the Daytronic System 10 linearization function to obtain correct flow display.

9-8 ENTERING TURBINE DATA USING THE "LINPAC" SOFTWARE PACKAGE

The Daytronic System 10 Datapac delivered with the 1276001 J52 Fuel Accessories Test Stand is equipped with the "L" linearizing function option. This assures precise parameter display values for measurement devices which have non-linear calibration characteristics. Up to eight (8) data tables (for up to eight corresponding input devices) containing a maximum of 50 data points each may be entered through the use of the Daytronic software package "Linpac" supplied on 5 1/4" floppy disk. "Linpac" is an IBM PC XT/AT compatible program, which must be run on an IBM compatible machine.

Whenever new turbine calibration data is to be entered into the System 10 Datapac, the following procedure must be used:

1. Preparing the Hardware

   a. Set up the IBM or IBM Compatible machine in a convenient location, preferably in front of the test stand within the reach of the Daytronic System 10 keyboard's cord.

   b. Using the supplied RS-232 crossover cable connect one end to the RS-232 serial computer interface port located on the rear of the System 10 Datapac.

   c. Connect the other end of the RS-232 crossover cable to the computer's RS-232 communication port.

   d. Turn on the test stand.

   e. Turn on the computer. Allow booting process to finish.

   f. Insert the "Linpac" floppy disk into the computer's floppy drive.

2. Prepare the System 10 Datapac

   a. Refering to the System 10 configuration listing located in Section 9-6 of this manual, note which channel(s) read the input for the turbine(s) for which data is to be entered.

   b. Using the System keyboard, enter the following keystroke sequence: TYP xx = D0 [Return], where xx is the channel number derived from the System 10 Configuration listing in Section 9-6. Verify that the System 10 has carried out that command by entering the following keystroke sequence: TYP xx [Return]. The response from the System 10 in the logo area of the screen should be TYP xx = D0. If not, re-enter the TYP xx = D0 sequence and verify.

   Do this for all data channels to be linearized. DO NOT re-type any turbine input channels for which data is not to be entered.

   c. Call utility page onto the screen by using the Page Function.

3. Run the Program

   a. If the computer being used is equipped with multiple drives, make sure the floppy drive which has the "Linpac" disk in it is being addressed.

   b. From the proper drive, start the program by entering the following keystroke sequence: BASICA COMMLINK [Return].

   c. Indicate which port is in use when interrogated by the "Commlink" program.

   d. If proper communication is verified, press any key to proceed. If not, re-check the cable connections, the baud setting of the System 10, and any other possible faults per the software's troubleshooting guidelines.

   e. From the "Linpac" program menu, select the "Lin" function by depressing the "C" key. An eight (8) item menu will appear.

f. Select the CREATE LINEARIZING funtion option.

g. From the System 10 Configuration listing, enter the proper function number, source channel number, linearized channel number, approximate slope, and filter for the data channel to be linearized.

h. The program will ask for the highest value of the source channel to be applied, this is done by entering the following keystroke sequence on the System 10 Datapac keyboard: CHN <u>xx</u> = <u>yyyy.y</u>, where <u>xx</u> is equal to the source channel number and <u>yyyy.y</u> is equal to the frequency of the turbine meter output at the maximum flow rate in hertz as found on the manufacturers turbine meter calibration data sheet.

NOTE

Frequency values input must be to one (1) decimal point of precision for all data input points <u>INCLUDING 0.0</u>. The System 10 will establish its internal scaling based on the least precise data entry point.

Verify that channel <u>xx</u> is displayed as the value of <u>yyyy.y</u> input by noting its value on both the computer monitor and the System 10 monitor.

If the value is not properly displayed, an input error was made. The above keystroke sequence must be repeated.

i. Once CHN <u>xx</u> reads the proper <u>yyyy.y</u> value, depress the space bar on the <u>computer</u> keyboard. Key in the corresponding flow value for the frequency value <u>yyyy.y</u> in PPH at customers S.G. as found on the manufacturers turbine meter calibration data sheet.

NOTE

For each flow value entered at this point in the loop, enter the value to the number of decimal points of precision desired on the monitor during normal operation. This includes the zero flow input value, as the System 10 will internally scale itself based on the least precise data input point.

Press the [Return] key.

j. The program will now continue in this fashion until all of the turbine calibration points have been entered by repeating steps h and i. Upon entering the maximum flow value, the program will revert to the previous menu.

k. To save the newly created linearization function on the floppy disk, select the # 2 SAVE LINEARIZATION option.

l. From the System 10 configuration listing, enter the appropriate function number for the data just entered. The file name is the serial number of the turbine meter, SN xxxx.

m. To save the newly created linearizaton statements on the floppy disk, select the # 4 SAVE LINEARIZATION STATEMENTS TO DISK option.

n. Enter the file name (serial number of the turbine) for the newly entered data.

o. Repeat the above procedures for all new data to be entered.

p. Once all data entry is complete and backed up to disk, select menu item 8 RETURN TO PAC MENU, and then key "X" to exit the software package to DOS.

4. Restore the System 10 Datapac

a. For each source channel re-typed to type "DO" in step 2b, enter the following keystroke sequences on the System 10 keyboard: 1.) TYP <u>xx</u> = 40 [Return], where <u>xx</u> is equal to the source channel number. Verify successful re-typing by entering TYP <u>xx</u> [Return]. 2.) FIL <u>xx</u> = 8 [Return], where <u>xx</u> is equal to the source channel number. Verify successful filter assignment by entering FIL <u>xx</u> [Return]. 3.) EMM <u>xx</u> = 2000.0 [Return], where <u>xx</u> is equal to the source channel. Verify proper "EMM" term assignment by entering EMM <u>xx</u> [Return].

b. Reset the System Channel Terminator by entering the following keystroke sequence on the System 10 keyboard: TER = 50 [Return]. Verify that the System Terminator has been changed to 50 by entering TER [Return].

c. Restore the System 10 monitor to its normal display Page # 1, by entering Page (Function Key F7) 1 [Return] on the System 10 keyboard.

5. Restore the Test Stand Hardware

a. Remove the RS-232 communication cable from the System 10.

b. Remove the jumper from wires 20 to 21 (CR3).

9-9 DAYTRONIC SYSTEM 10 CONFIGURATION (Memory Map)
Navy, Jacksonville JOB 9513
Bauer Aerospace Model 1276001 J52 Fuel Accessories Test Stand

I. REAL DATA ANALOG INPUT / OUTPUT CHANNELS

Chn No.	Card Description	Card P/N	Chn Typ	Chn Lct	B/M Det# Source
	THERMOCOUPLE OUTPUT (Support Card)	10A11		1011	E65
	8 CHANNEL INPUT THERMOCOUPLE	10A9-8			E64
1	T1 - Reservoir Temperature		29	1021	E641
2	T2 - High Flow Fuel Supply		29	1022	E642
3	T3 - Low Flow Fuel Supply		29	1023	E643
4	T4 - Total Flow System Inlet		29	1024	E644
5	T5 - Low Flow Fuel Return		29	1025	E645
6	T6 - Primary/PRV Metered Discharge		29	1026	E646
7	T7 - Secondary/PRV Bypass Discharge		29	1027	E647
8	T8 - TSSA Fuel Temperature		2A	1028	E100
	FREQUENCY INPUT CONDITIONER	10A40X3			E67
9	Primary/PRV Metered Discharge (170-24700 PPH)		40	1031	E665
	FREQUENCY INPUT CONDITIONER	10A40X3			E68
10	Secondary PRV Bypass Discharge (170-24700 PPH)		40	1041	E666
	FREQUENCY INPUT CONDITIONER	10A40X3			E69
11	Total Flow System (Low Range) (3.4-47.5 PPH)		40	1051	E663
	FREQUENCY INPUT CONDITIONER	10A40X3			E70
12	Total Flow System (Mid Range) (22-475 PPH)		40	1061	E664
	FREQUENCY INPUT CONDITIONER	10A40X3			E71
13	Total Flow System (High Range) (170-24700 PPH)		40	1071	E667

I. REAL DATA ANALOG INPUT / OUTPUT CHANNELS (Cont'd)

Chn No.	Card Description	Card P/N	Chn Typ	Chn Lct	B/M Det# Source
	ENHANCED DUAL STRAIN GAGE CONDITIONER	10A72-2			E72
14	0-75.0 PSIA		72	1081	E684
15	0-50" H2O		72	1082	E685
	ENHANCED DUAL STRAIN GAGE CONDITIONER	10A72-2			E73
16	0-10.0 PSID		72	1091	E686
17	0-75.0 PSID		72	1092	E687
	ENHANCED DUAL STRAIN GAGE CONDITIONER	10A72-2			E74
18	0-500.0 PSID		72	1101	E688
19	Not Used		72	1102	
	DUAL STRAIN GAGE CONDITIONER	10A70-2X8			E75
20	0-30.0 PSIG		72	1111	E674
21	0-100.0 PSIG		72	1112	E675
	DUAL STRAIN GAGE CONDITIONER	10A70-2X8			E76
22	0-300 PSIG		72	1121	E676
23	0-300 PSIG		72	1122	E677
	DUAL STRAIN GAUGE CONDITIONER	10A70-2X8			E77
24	0-300 PSIG		72	1131	E678
25	0-300 PSIG		72	1132	E673
	DUAL STRAIN GAUGE CONDITIONER	10A70-2X8			E78
26	0-500 PSIG		72	1141	E679
27	0-800 PSIG		72	1142	E680
	DUAL STRAIN GAUGE CONDITIONER	10A70-2X8			E79
28	0-1500 PSIG		72	1151	E681
29	0-1500 PSIG		72	1152	E682

I. REAL DATA ANALOG INPUT / OUTPUT CHANNELS (Cont'd)

Chn No.	Card Description	Card P/N	Chn Typ	Chn Lct	B/M Det# Source
	DUAL STRAIN GAUGE CONDITIONER	10A70-2X8			E80
30	0-1500 PSIG		72	1161	E683
31	Not used		72	1162	

II. INTERNAL CHANNEL ASSIGNMENTS

Chn	Function	Channel Type
32-58	Left open to facilitate future system expansion.	55
59	Linearized flow readout channel for the Primary/PRV Metered Discharge Turbine Flowmeter calibrated between 170-24700 PPH at a resolution of 1 PPH	EA
60	Linearized flow readout channel for the Primary/PRV Metered Discharge Turbine Flowmeter calibrated between 170 and 24700 PPH at a resolution of 1 PPH.	EA
61	Linearized flow readout channel for the Total Flow System (Low Range) Turbine Flowmeter calibrated between 3.4 and 47.5 PPH at a resolution of 1 PPH.	EA
62	Linearized flow readout channel for the Total Flow System (Mid Range) Turbine Flowmeter calibrated between 22 and 475 PPH at a resolution of 1 PPH.	EA
63	Linearized flow readout channel for the Total Flow System (High Range) Flowmeter calibrated between 170 and 24700 PPH at a resolution of 1 PPH.	EA
64-81	Not Used	
82	Pseudo channel used as a logic 1 or 0 in the executable routine which automatically switches the Total Flow System Turbine Flowmeters display field between the high, mid, and low ranges.	DO
83	Pseudo channel used as a logic 1 or 0 in the executable routine which automatically switches the Total Flow System Turbine Flowmeters display field between the high, mid, and low ranges.	DO
84	Calculation which, depending on the value of Chn 82, yields either a 0 or the live value of the Total Flow System Low range Turbine Flowmeter reading expressed directly in PPH.	F2
85	Calculation which, depending on the value of Chn 83, yields either a 0 or the live value of the Total Flow System Mid range Turbine Flowmeter reading expressed directly in PPH.	F2
86	Not used	55

87	Calculation which sums the values of Chn 84 and Chn 85 to yield the live value of the Mid and Low Range Total Flow System Turbine Flowmeters reading expressed directly in PPH.	F0
88	Calculation which is dynamically written to EEPROM memory by CMD's 1 & 2 to facilitate the display of either the Low or Mid Range Total Flow System Turbine Flowmeters (CHN 87) or the High Range Total Flow System Turbine Flowmeter. The dynamic changing of the calculation is necessary to achieve two different levels of precision on this flow readout since the Daytronic System 10 is not itself a floating point instrument.	F6
89-100	Not used	55

III. EXTERNAL I/O BIT ASSIGNMENTS

Card 1, BSLOT2=1,1 **10BIO-16** **E42**

Bit No.	Bit Function	Logic Source	I/O Source
0	Total Flow System Switching (Low to Mid)	EXT,NON	EXU19 EXU20
1	Total Flow System Switching	EXT,NON	EXU18 EXU21
2- 15	NOT USED	EXT,NON	

IV. INTERNAL BIT ASSIGNMENTS

Bit No.	Bit Function	Logic Source	I/O Source
16- 17	Not used	LIM,NON	
18	Total Flow System Switching - Low to Mid	LIM,NON	LGT12
19	Total Flow System Switching - Mid to High	LIM,NON	LGT13
20	Total Flow System Switching - High to Mid	LIM,NON	LLT13
21	Total Flow System Switching - Mid to low	LIM,NON	LLT12
22- 31	Not used	LIM,NON	

D.) TOTAL FLOW SYSTEM TURBINE FLOWMETER SWITCHING ROUTINE

This routine automatically configures the Total Flow System turbine flowmeter switching manifold by monitoring the incoming frequency signal of the mid and High Range flow turbines. Also, the data channel displayed on the operator screen is automatically switched such that the reading being displayed is always from the currently active turbine.

LOL12=CHN200	This sets the low flow limit for the Mid Range turbine meter equal to the value of CHN 200. CHN 200 is dynamically set to either 62.0 or -99.9 Hertz by EXU's 25, 26 and 19. The signal monitored is the output of the Mid Range turbine and the values stated represent the desired flow value at which the flow manifold will switch from the Mid Range to the Low Range turbine meter. The displayed flow value will be from the Low Range Total Flow System turbine flowmeter.
HIL12=120.0	This sets the high flow limit for the Low Range turbine meter at 120.0 Hertz output signal from the Mid Range turbine. This represents the desired flow value at which the flow manifold will switch from the Low Range to the Mid Range turbine meter. The displayed flow value will be from the Mid Range Total Flow System turbine meter.
LOL13=10.0	This sets the low flow limit for the High Range turbine meter at 10.0 Hertz output signal from the High Range turbine. This represents the desired flow value at which the flow manifold will switch from the High Range to the Mid Range turbine meter. The display value will be from the Mid Range Total Flow System turbine meter.
HIL13=31.0	This sets the high flow limit for the mid range turbine meter at 31.0 Hertz output signal from the high range turbine. This represents the desired value at which the flow manifold will switch from the mid range to the high range turbine meter. The display value will be from the high range Total Flow System turbine meter.
LLT12=21	When channel 12 falls below the preset limit, internal BIT #21 will turn "on" (Logic value 1).
LGT12=18	When channel 12 exceeds the preset limit, internal BIT #18 will turn "on" (Logic value 1).

D.) TOTAL FLOW SYSTEM TURBINE FLOWMETER SWITCHING ROUTINE (Cont'd)

LLT13=20 When channel 13 falls below the preset limit, internal BIT #20 will turn "on" (Logic value 1).

LGT13=19 When channel 13 exceeds the preset limit, internal BIT #19 will turn "on" (Logic value 1).

EXU18=CHN82=0:CHN83=1:BIT0=0:BIT26=1

This statement is executed each time that Bit #18 changes state from "off" to "on" (Logic 0 to Logic 1). When this occurs, CHN 82 is set to a value of 0, CHN 83 is set to a value of 1, BIT #0 is turned "off" (Logic 0), and BIT #26 is turned "on" (Logic 1). The effect of CHN 82 being set to a value of 0 is to prevent the live value of the Low Range turbine from being displayed via CLC 84 and CLC 87 below. The effect of CHN 83 being set to a value of 1 is to allow the live value of the Mid Range turbine to be displayed via CLC 85 and CLC 87 below. BIT #2 is an external bit which controls the action of the Low to Mid Range switching valve on the Total Flow System turbine flowmeter manifold. In this case the valve is being opened since BIT #18 turns "on" only when the flowrate has exceeded the maximum permissible rate for the Low Range turbine. BIT #26 is an internal bit whose associated EXU statement sets the low flow limit for the Mid Range turbine at 62.0 HZ.

EXU26=CHN200=62.0:BIT26=0

This statement is executed each time that Bit #26 changes state from "off" to "on" (Logic 0 to Logic 1). When this occurs, CHN 200 is set to a value of 62.0 enabling the Mid to Low range switching logic which follows, and BIT #26 is turned "off" (Logic 0), to reset it so that it is available on the next turbine switching cycle.

D.) TOTAL FLOW SYSTEM TURBINE FLOWMETER SWITCHING ROUTINE (Cont'd)

EXU19=BIT1=0:BIT999=1:CHN200=-99.9

This statement is executed each time that Bit #19 changes state from "off" to "on" (Logic 0 to Logic 1). When this occurs, BIT #1 is turned "off" (Logic 0), BIT #999 is turned "on" (Logic 1), and CHN 200 is set to a value of -99.9. BIT #1 is an external bit which controls the action of the Mid to High Range switching valve on the Total Flow System turbine flowmeter manifold. In this case the valve is being opened since BIT #19 turns "on" only when the flowrate has exceeded the maximum permissible rate for the Mid Range turbine. Bit #999 is the internal System 10 bit which opens the EEPROM write protect switch via its internal software and at this point it is being opened to allow CLC 88 to be dynamically changed to equal the output of the High Range Total Flow System turbine flowmeter at a resolution of 1 PPH. CHN 200, which is the low frequency limit for the Mid Range turbine, is being set to a value which is unattainable to prevent erroneous switches downward to the low flow turbine while the flow manifold in configured for high flow. This is necessary because the output frequency of the Mid Range turbine drops to nearly 0 once the switching valve opens to allow the flow to bypass it.

CDL1=/BIT1*/0*19*INT6

This statement is a Conditional and is read as follows: When BIT #1 <u>is not</u> "on", <u>and</u> BIT #0 <u>is not</u> "on", <u>and</u> BIT #19 <u>is</u> "on", <u>and</u> a time interval of 1 second has elapsed, then and only then carry out the instructions contained within the associated CMD1.

CMD1=CLC88=1(CHN63)+0:BIT24=1

This command is carried out each time that CDL1 is true. Following the sequence of the previous two executable statements it can be seen that both BITS #1 & #0 are "off", and BIT #19 is "on". One second after EXU19 has been completed CLC88 will be rewritten to the equation CLC88=1(CHN63)+0 contained within this command. BIT #24, an internal bit, is also turned "on" to allow its associated executable statement to carry out further instructions required to complete this switching task.

D.) TOTAL FLOW SYSTEM TURBINE FLOWMETER SWITCHING ROUTINE (Cont'd)

EXU24=BIT999=0:BIT24=0

This statement is executed each time that Bit #24 changes state from "off" to "on" (Logic 0 to Logic 1). When this occurs, BIT #999 is turned "off" (Logic 0) closing the EEPROM switch to protect the memory, and BIT #24 is turned "off" (Logic 0), to reset it so that it is available on the next turbine switching cycle.

EXU20=BIT1=1:BIT999=1

This statement is executed each time that Bit #20 changes state from "off" to "on" (Logic 0 to Logic 1). When this occurs, BIT #1 is turned "on" (Logic 1), and BIT #999 is turned "on" (Logic 1). BIT #1 is an external bit which controls the action of the Mid to High Range switching valve on the Total Flow system turbine flowmeter manifold. In this case the valve is being closed since BIT #19 turns "on" only when the flowrate has dropped below the minimum permissible rate for the High Range turbine. Bit #999 is the internal System 10 bit which opens the EEPROM write protect switch via its internal soft- ware and at this point it is being opened to allow CLC 88 to be dynamically changed to equal the output of the Mid Range Total Flow System turbine flowmeter at a resolution of .1 PPH.

CDL2=BIT1*/0*20*INT7

This statement is a Conditional and is read as follows: When BIT #1 <u>is</u> "on", <u>and</u> BIT #0 <u>is not</u> "on", <u>and</u> BIT #20 <u>is</u> "on", <u>and</u> a time interval of 2 seconds has elapsed, then and only then carry out the instructions contained within the associated CMD2.

CMD2=CLC88=1(CHN87)+.0:BIT25=1

This command is carried out each time that CDL2 is true. Following the sequence of the previous statements it can be seen that at this point BIT #1 is now "on", BIT #0 is "off", and BIT #20 is "on". Two seconds after EXU20 has been completed CLC88 will be rewritten to the equation CLC88=1(CHN87)+.0 contained within this command. BIT #25, an internal bit, is also turned "on" to allow its associated executable statement to carry out further instructions required to complete this switching task.

D.) TOTAL FLOW SYSTEM TURBINE FLOWMETER SWITCHING ROUTINE (Cont'd)

EXU25=CHN200=62.0:BIT999=0:BIT25=0

This statement is executed each time that Bit #25 changes state from "off" to "on" (Logic 0 to Logic 1). When this occurs, CHN 200 is reset to 62.0 to enable the Mid Range to Low Range switching logic which follows, BIT #999 is turned "off" (Logic 0) closing the EEPROM switch to protect the memory, and BIT #25 is turned "off" (Logic 0), to reset it so that it is available on the next turbine switching cycle.

EXU21=CHN82=1:CHN83=0:BIT0=1

This statement is executed each time that Bit #21 changes state from "off" to "on" (Logic 0 to Logic 1). When this occurs, CHN 82 is set to a value of 1, CHN 83 is set to a value of 0, and BIT #0 is turned "on" (Logic 1). The effect of CHN 82 being set to a value of 1 is to allow the live value of the Low Range turbine to be displayed via CLC 84 and CLC 87 below. The effect of CHN 83 being set to a value of 0 is to prevent the live value of the Mid Range turbine from being displayed via CLC 85 and CLC 87 below. BIT #0 is an external bit which controls the action of the Low to Mid Range switching valve on the Total Flow System turbine flowmeter manifold. In this case the valve is being closed since BIT #21 turns "on" only when the flowrate has dropped below the minimum permissible rate for the Mid Range turbine

CLC84=1(CHN82)(CHN61)+.0

Calculation which, depending on the value of logic CHN 82, will yield either a 0 or the live value of the Low Range Total Flow System turbine flowmeter.

CLC85=1(CHN83)(CHN62)+.0

Calculation which, depending on the value of logic CHN 83, will yield either a 0 or the live value of the Mid Range Total Flow System turbine flowmeter.

CLC87=1(CHN84+CHN85)+.0

Calculation which will yield either the live value of the Low Range or the Mid Range Total Flow System turbine flowmeter depending on the values of logic channels 82 and 83.

D.) TOTAL FLOW SYSTEM TURBINE FLOWMETER SWITCHING ROUTINE (Cont'd)

CLC88=1(CHN87)+.0 OR CLC88=1(CHN109)+0

Calculation which is dynamically rewritten by CMD1 and CMD2 during test stand operation. This process is absolutely necessary if the false floating point precision of this data channel is to be accomplished. This is the data channel which is displayed on the Component Test screens and is also the data channel which is logged by the Data Acquisition software.

VIII. RANDOM STATEMENTS

===

A.) Video Monitor Setup

REF=15	This sets the refresh or update rate of the parameters displayed on the screen at 4 updates/second. (60 divided by 15)
VDU=C,60	This tells the system it is operating a color monitor on 60 Hz power.
BAU=3,7,2,0	This sets the communications protocol at 2400 Baud, 7 data bits, 2 stop bits, and no parity

C.) Frequency Card Setup

TYP 9=40	EMM 9=2000.0	BEE 9=0	FIL 9=4
TYP 10=40	EMM 10=2000.0	BEE 10=0	FIL 10=4
TYP 11=40	EMM 11=2000.0	BEE 11=0	FIL 11=4
TYP 12=40	EMM 12=2000.0	BEE 12=0	FIL 12=4
TYP 13=40	EMM 13=2000.0	BEE 13=0	FIL 13=4

IX. TURBINE FLOWMETER LINEARIZATION FUNCTIONS

Test Stand Item #	:	E665
Flow Parameter	:	PRIMARY/PRV Metered Discharge Flow
File Name	:	SN52052
Function Number	:	F1
Source Channel	:	9
Linearized Channel	:	59
Approximate Slope	:	3
Filter	:	4

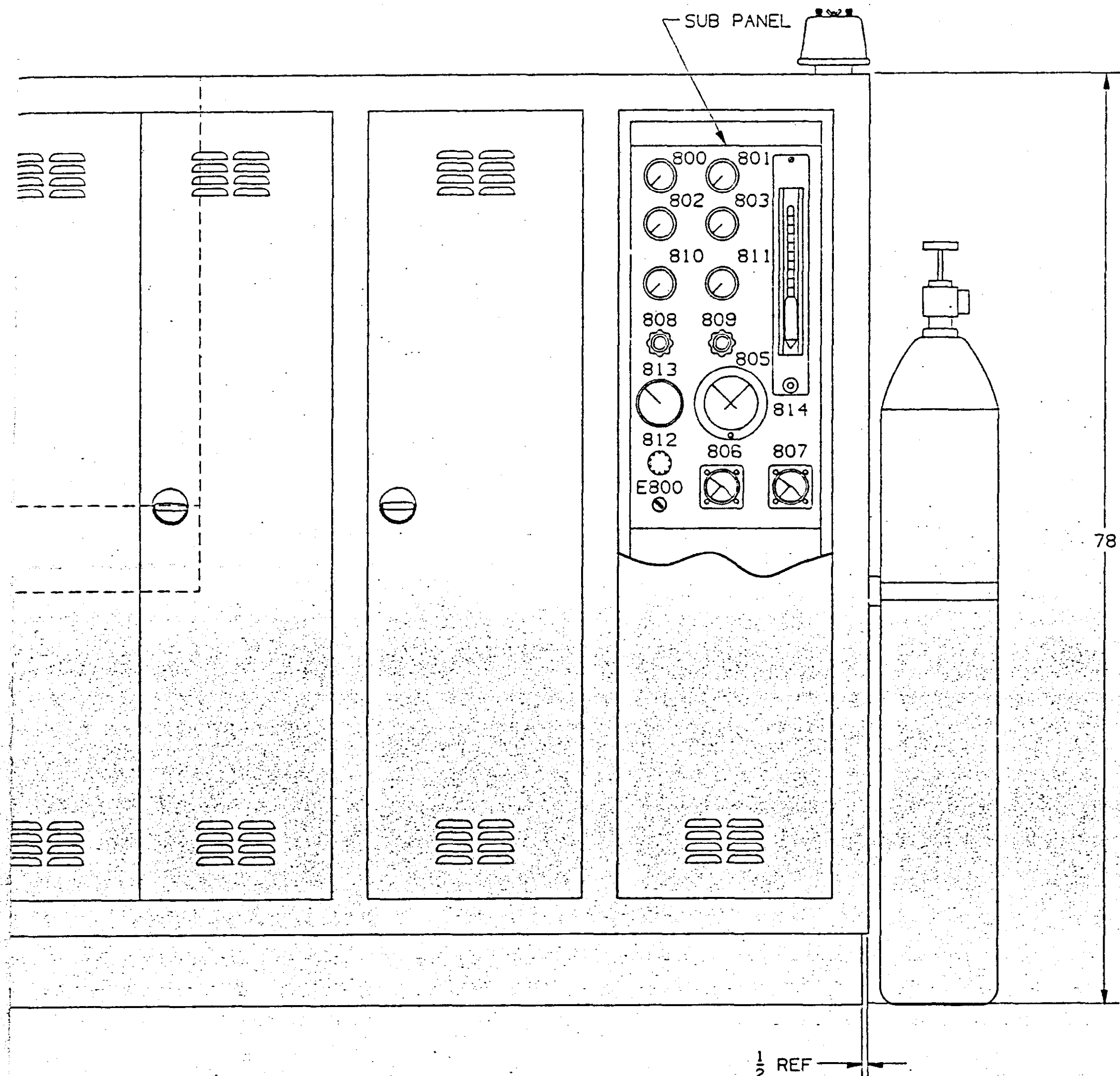
Test Stand Item #	:	E666
Flow Parameter	:	Secondary/PRV Metered Discharge Flow
File Name	:	SN52012
Function Number	:	F2
Source Channel	:	10
Linearized Channel	:	60
Approximate Slope	:	3
Filter	:	4

Test Stand Item #	:	E663
Flow Parameter	:	Total Flow System - Low Range Turbine
File Name	:	SN52332
Function Number	:	F3
Source Channel	:	11
Linearized Channel	:	61
Approximate Slope	:	3
Filter	:	4

Test Stand Item #	:	E664
Flow Parameter	:	Total Flow System - Mid Range Turbine
File name	:	SN52635
Function Number	:	F4
Source Channel	:	12
Linearized Channel	:	62
Approximate Slope	:	3
Filter	:	4

Test Stand Item #	:	E667
Flow Parameter	:	Total Flow System-High Range Turbine
File Name	:	SN52017
Function Number	:	F5
Source Channel	:	13
Linearized Channel	:	63
Approximate Slope	:	3
Filter	:	4

SECTION X
SCHEMATIC DRAWINGS



RIGHT SIDE VIEW

QTY REQD	ITEM NO.	FSCM NO.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
N/A	N/A	N/A

MATERIAL: N/A

FINISH: N/A

	SIGNATURES	DATE
DWN	A. GERVASI	4-28-89
CHKR	B. CROWELL	5-23-90
ENGR	J. COLEMAN	3-14-89
QUAL		

BAUER AEROSPACE INC.
FARMINGTON, CT. U.S.A.

J52 FUEL ACCESSORIES TEST STAND

GENERAL ARRANGEMENT

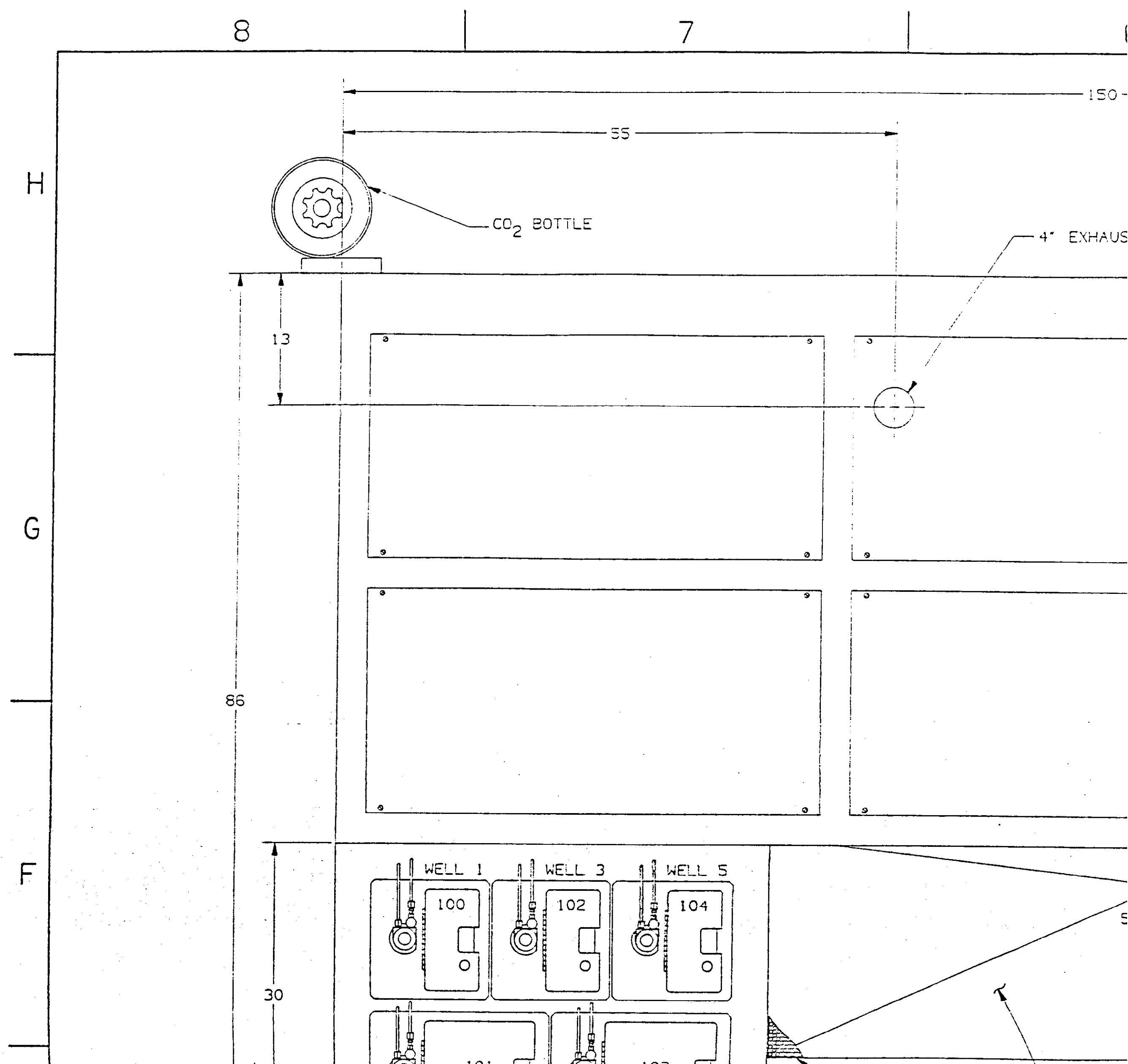
SIZE	FSCM NO.	DWG NO.	REV
E	70882	1276001T	

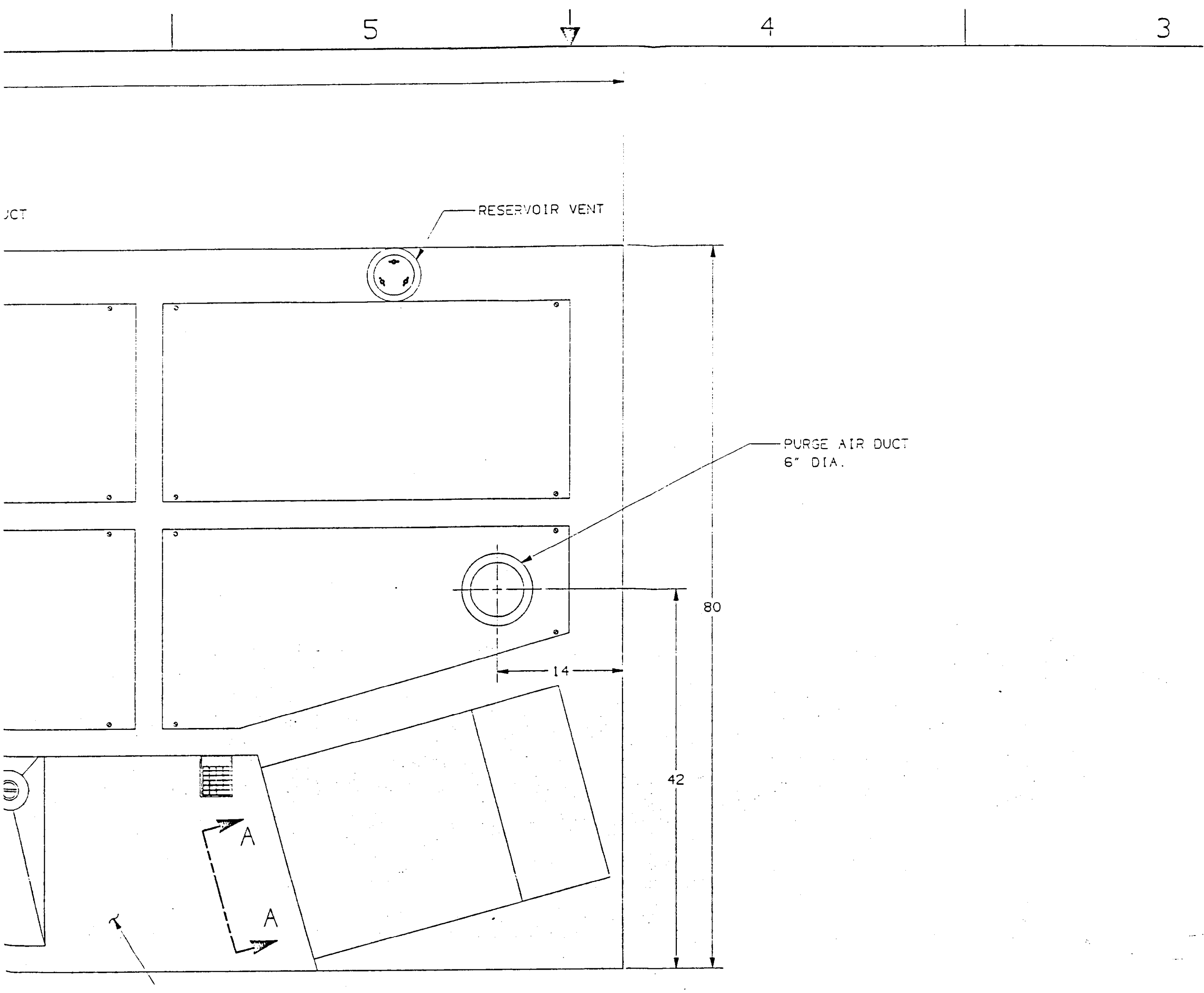
SCALE 1:8 | WEIGHT N/A | SHEET 1 OF 8

NEXT ASS'Y	USED ON
1276001	JOB 9513

APPLICATION

1276001T

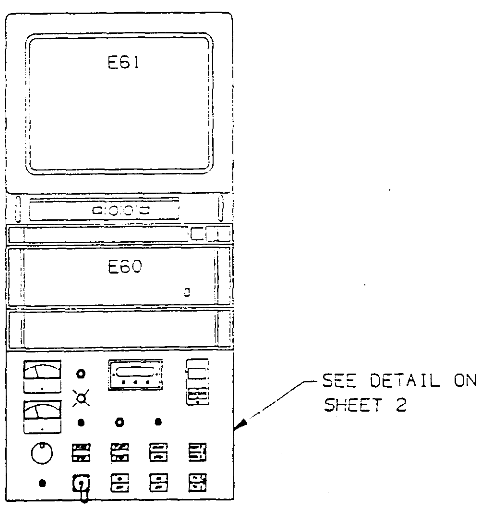

8
7
H
G
F
150
55
CO_2 BOTTLE
4" EXHAUS
13
86
30
WELL 1
WELL 3
WELL 5
100
102
104


5
4
3
JCT
RESERVOIR VENT
PURGE AIR DUCT
6" DIA.
80
14
42
A
A

3 2 1

REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

H



VIEW A-A

G

F

E

D

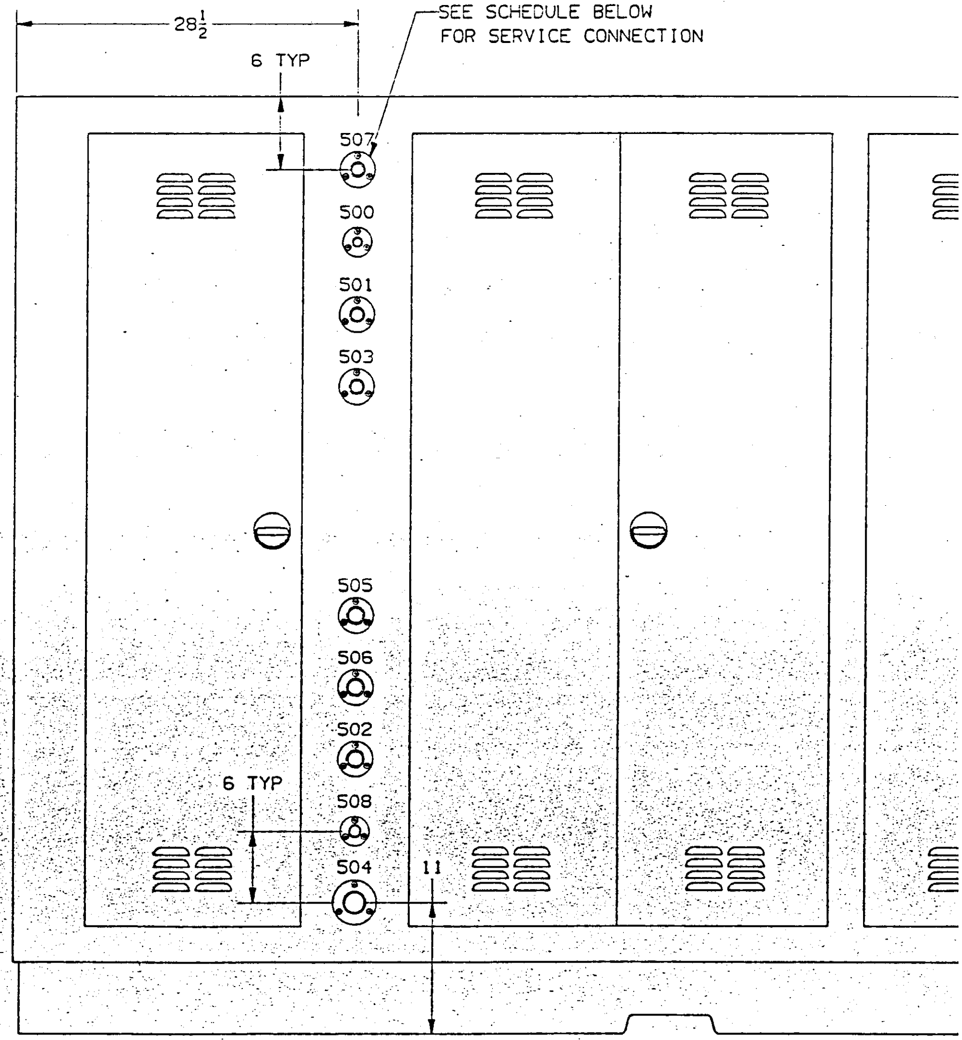
C

B

A

DC SUPPLY/
STOP/START PANEL

SCALE: 3/4"=1"

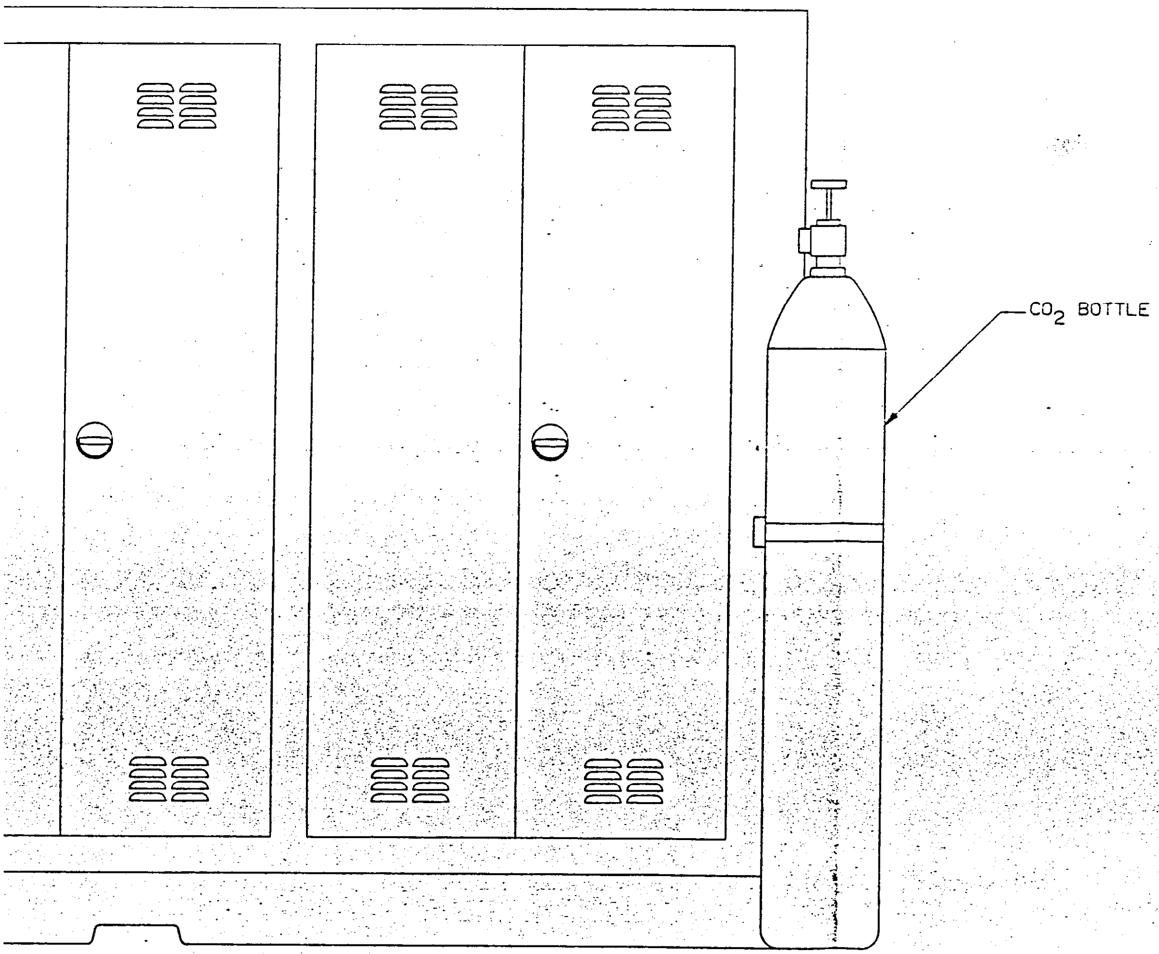


SERVICE SCHEDULE

DET	SIZE	DESCRIPTION
500	3/8" NPT	HIGH PRESSURE AIR
501	3/4" NPT	SHOP AIR
502	1" NPT	SINK DRAIN
503	3/4" NPT	RESERVOIR PRESSURE FILL
504	1 1/4" NPT	RESERVOIR DRAIN
505	1" NPT	WATER INLET
506	1" NPT	WATER OUTLET
507	3/4" NPT	STEAM INLET
508	1/2" NPT	CONDENSATE OUTLET

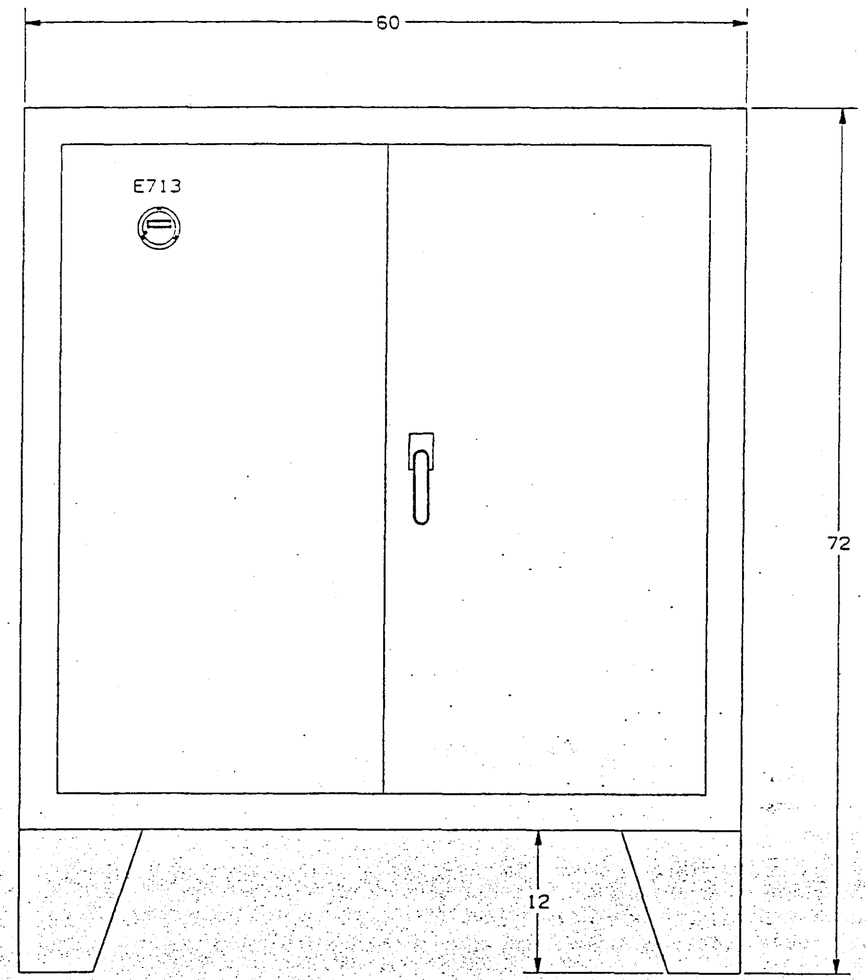
REAR VI

8 7 6



5 4

SCALE: 1"=1"



MAIN SWITCHGEAR CABINET
E739
$11\frac{1}{2}$ DEEP

QTY REQD	ITEM NO.	FSCM NO.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE

PARTS LIST

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
N/A	N/A	N/A

MATERIAL: N/A

FINISH: N/A

1276001	JOB 9513
NEXT ASS'Y	USED ON

APPLICATION

SIGNATURES		DATE
DWN	A. GERVASI	3-20-90
CHKR	B. CROWELL	5-16-90
ENGR	J. COLEMAN	3-14-89
QUAL		

BAUER AEROSPACE INC.
FARMINGTON, CT. U.S.A.

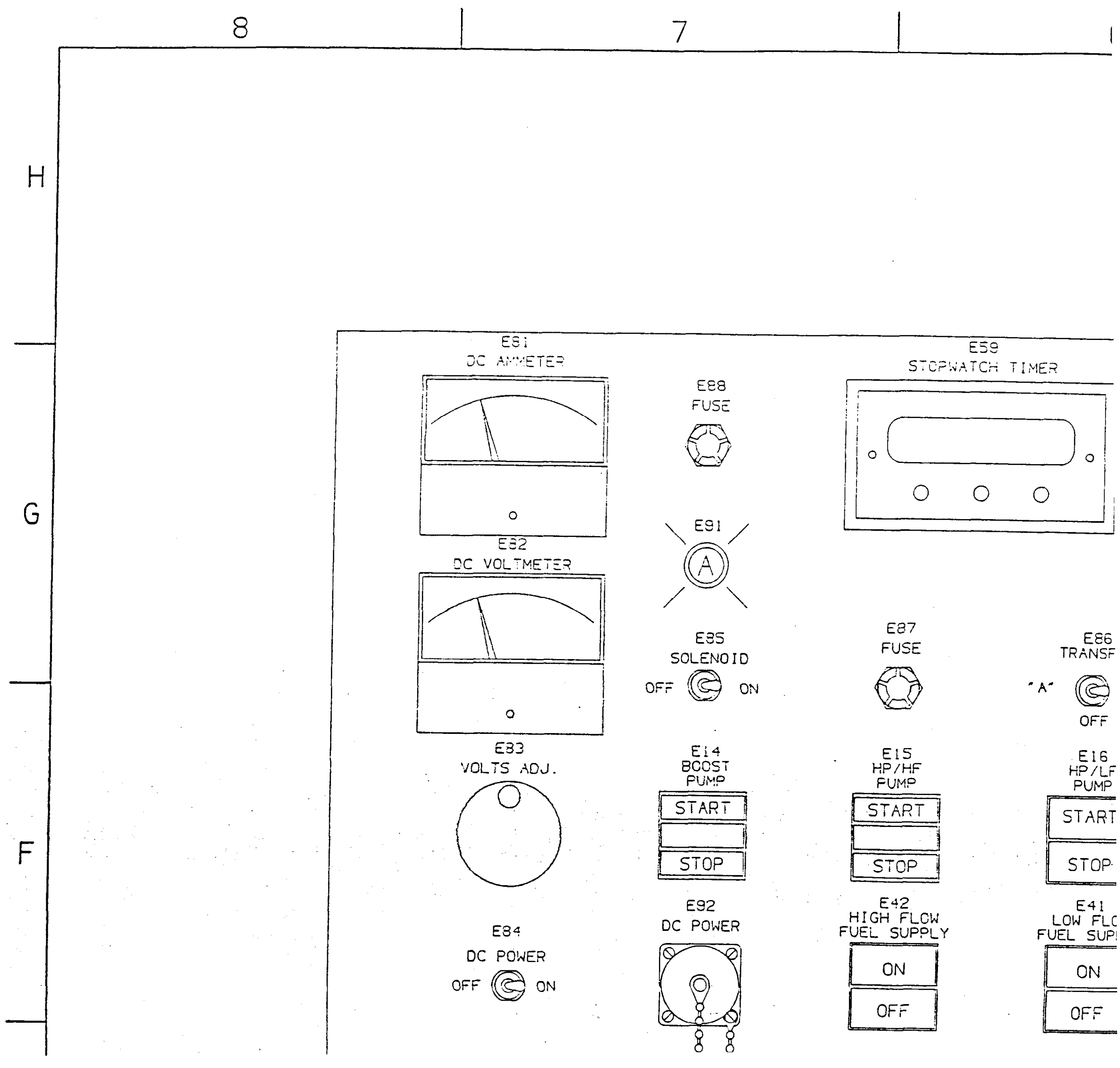
J52 FUEL ACCESSORIES TEST STAND

GENERAL ARRANGEMENT

SIZE	FSCM NO.	DWG NO.	REV
E	70882	1276001T	

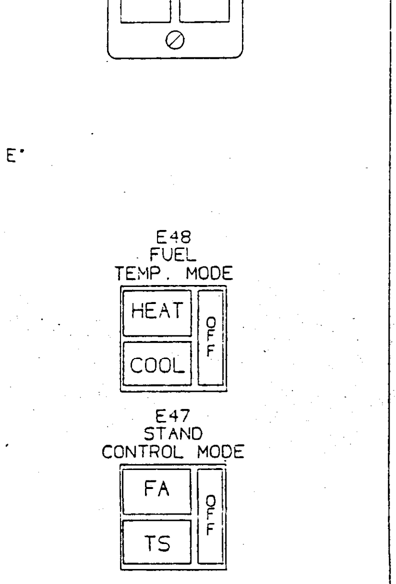
SCALE 1:8 | WEIGHT N/A | SHEET 2 OF 8

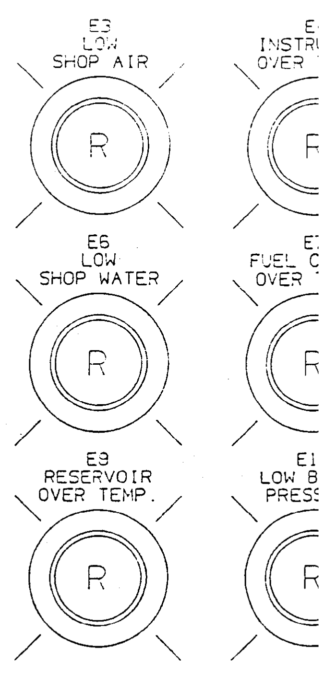
1276001T



8
7
H
G
F
E81
DC AMMETER
E88
FUSE
E59
STOPWATCH TIMER
E91
A
E82
DC VOLTMETER
E85
SOLENOID
OFF
ON
E87
FUSE
E86
TRANSF
"A"
OFF
E83
VOLTS ADJ.
E14
BOOST
PUMP
START
STOP
E15
HP/HF
PUMP
START
STOP
E16
HP/LF
PUMP
START
STOP
E84
DC POWER
OFF
ON
E92
DC POWER
E42
HIGH FLOW
FUEL SUPPLY
ON
OFF
E41
LOW FLO
FUEL SUP
ON
OFF

5 4 3

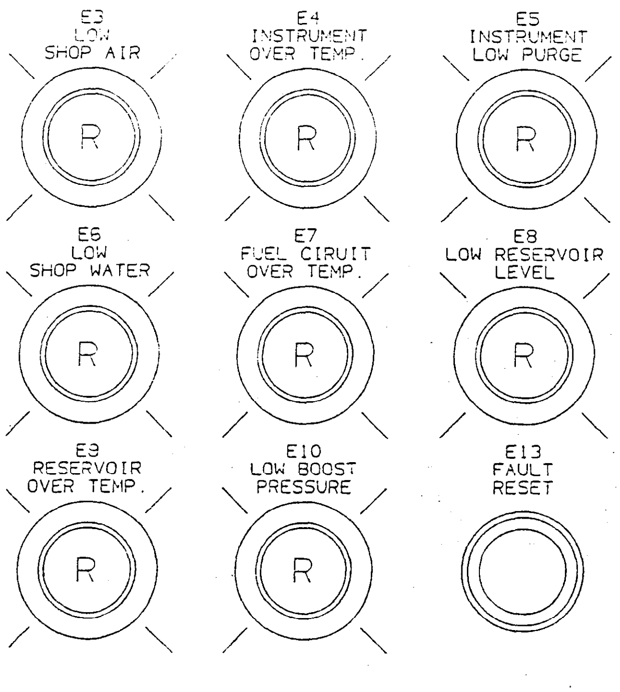

E53
FUEL TEMP.
CONTROLLER
E48
FUEL
TEMP. MODE
HEAT
COOL
OFF
E47
STAND
CONTROL MODE
FA
TS
OFF


E3
LOW
SHOP AIR
R
E6
LOW
SHOP WATER
R
E9
RESERVOIR
OVER TEMP.
R
R
R
R

3 2 1

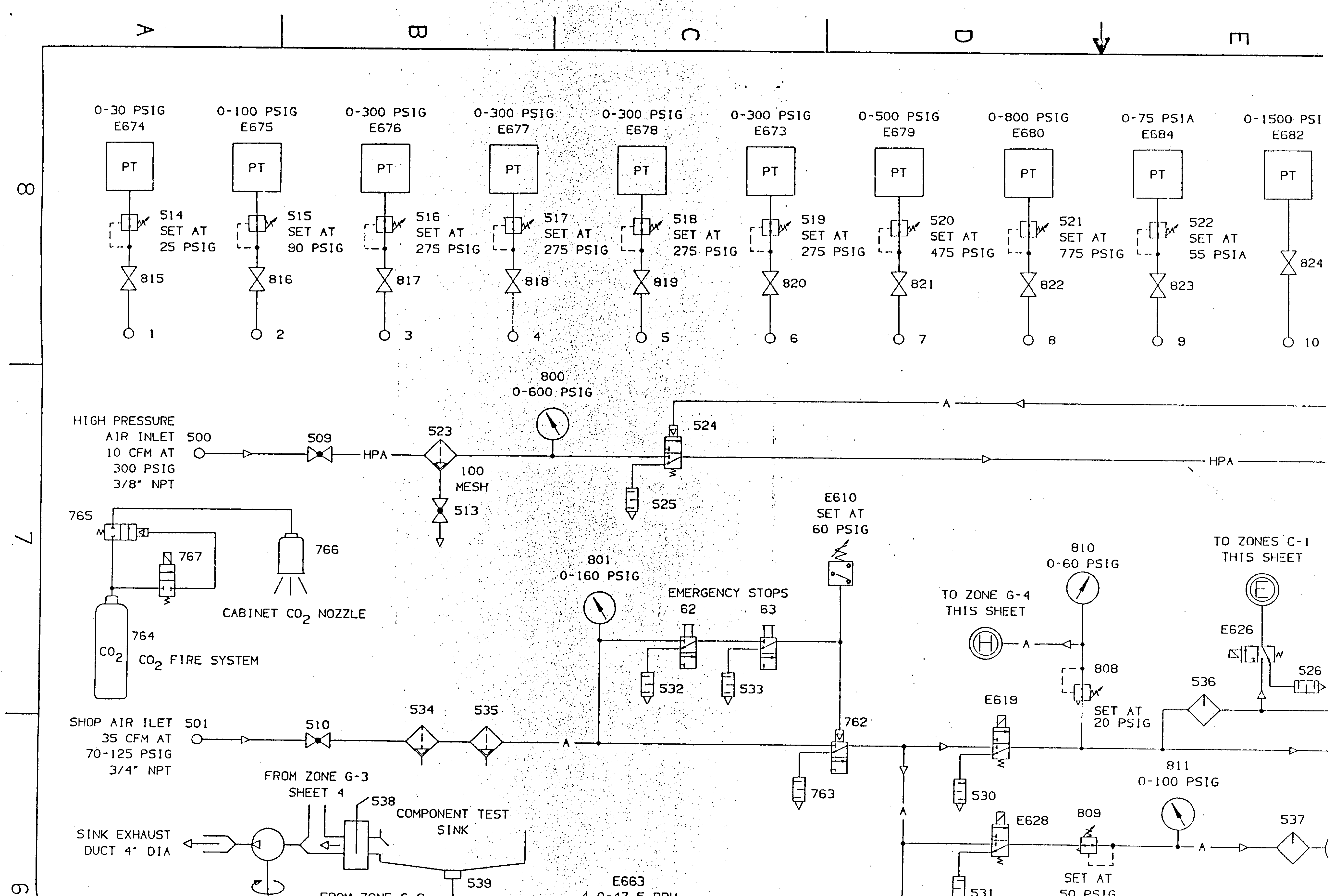
REVISIONS				
ZONE	LTR	DESCRIPTION	DATE	APPROVED

H

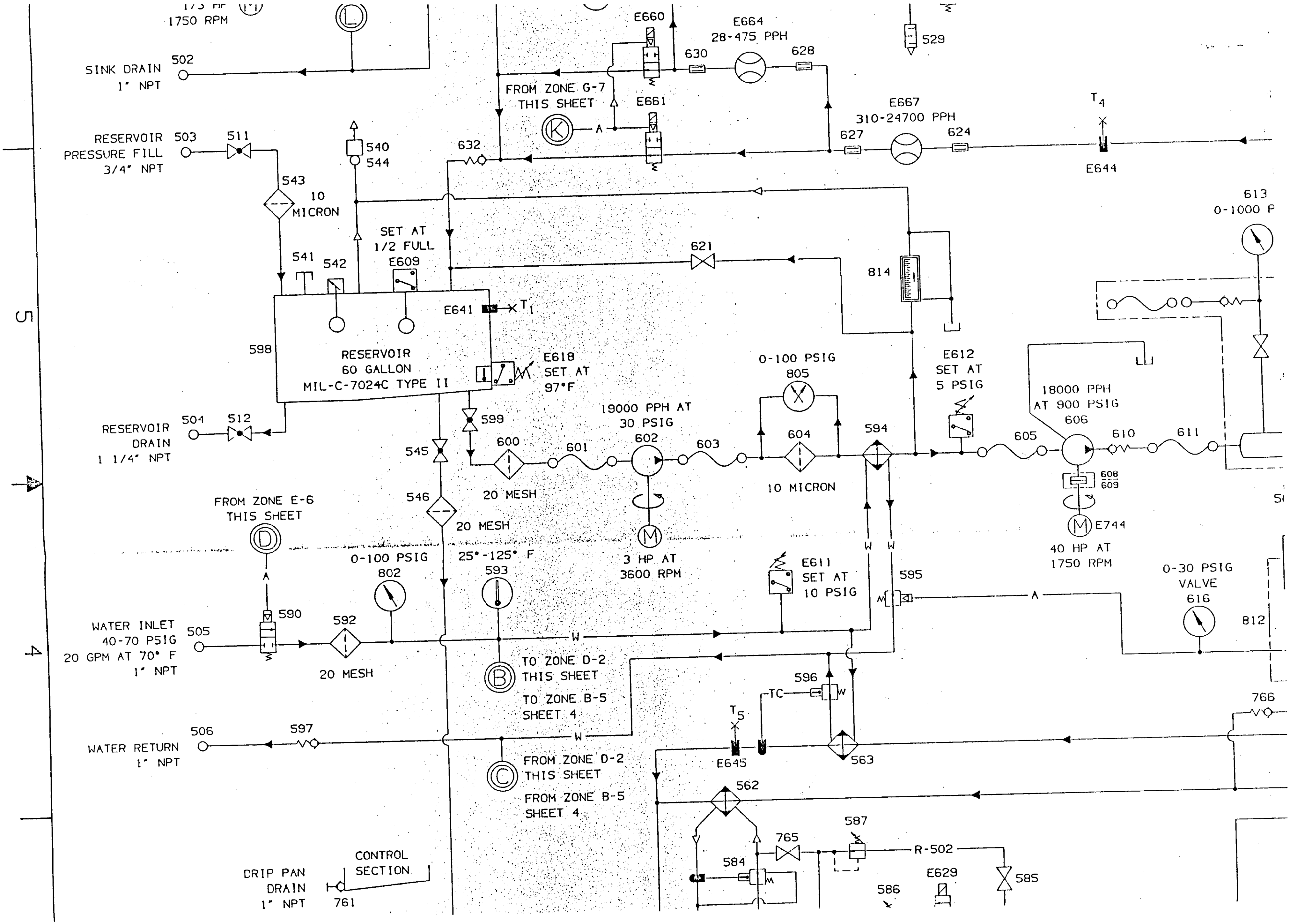


G

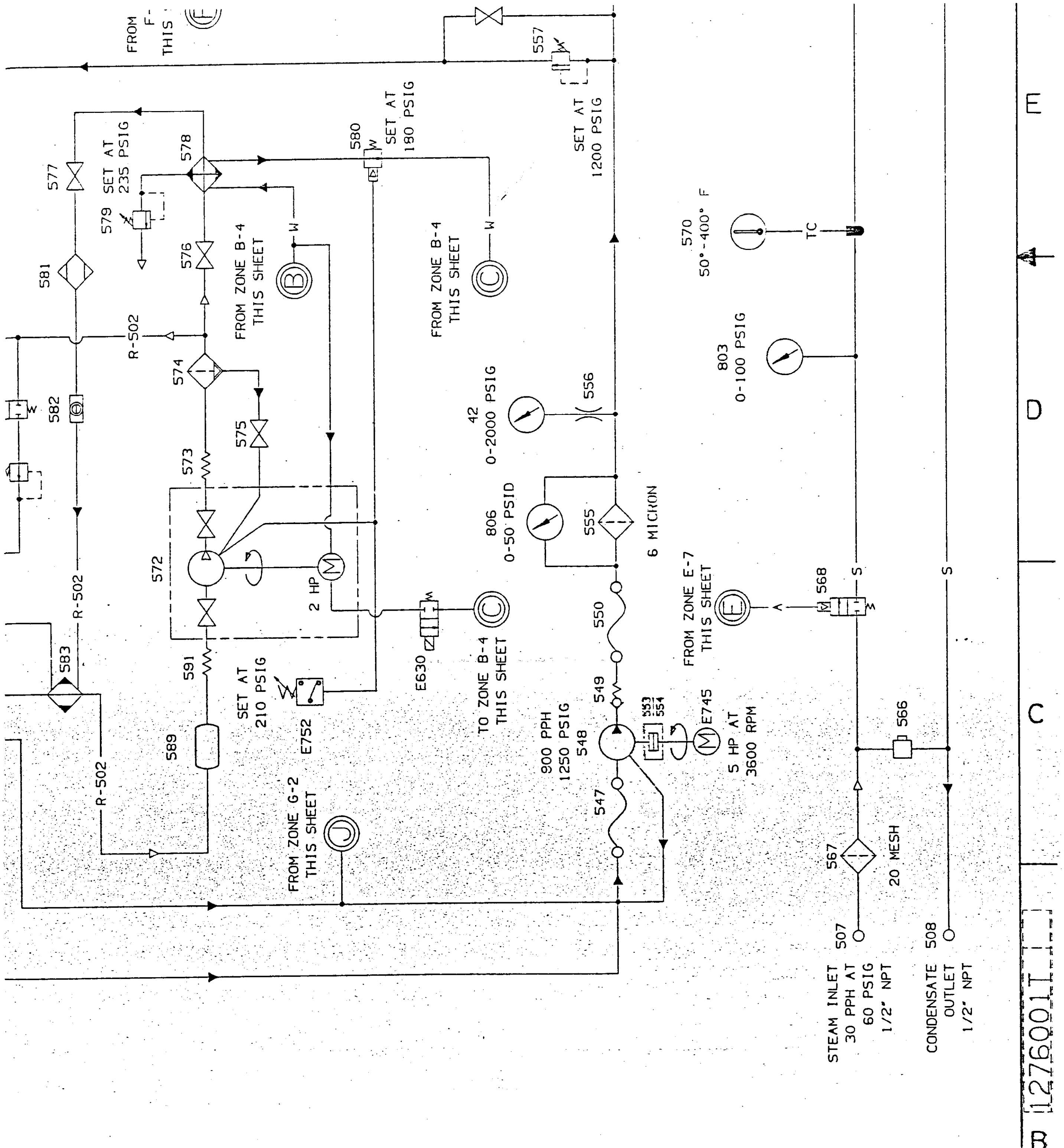
F



A
B
C
D
E
8
7
6
0-30 PSIG
E674
0-100 PSIG
E675
0-300 PSIG
E676
0-300 PSIG
E677
0-300 PSIG
E678
0-300 PSIG
E673
0-500 PSIG
E679
0-800 PSIG
E680
0-75 PSIA
E684
0-1500 PSI
E682
PT
514 SET AT 25 PSIG
515 SET AT 90 PSIG
516 SET AT 275 PSIG
517 SET AT 275 PSIG
518 SET AT 275 PSIG
519 SET AT 275 PSIG
520 SET AT 475 PSIG
521 SET AT 775 PSIG
522 SET AT 55 PSIA
815
816
817
818
819
820
821
822
823
824
1
2
3
4
5
6
7
8
9
10
800
0-600 PSIG
HIGH PRESSURE AIR INLET 500
10 CFM AT 300 PSIG 3/8" NPT
509
HPA
523
100 MESH
513
524
525
A
765
767
766
CABINET CO_2 NOZZLE
764
CO_2
CO_2 FIRE SYSTEM
801
0-160 PSIG
E610
SET AT 60 PSIG
EMERGENCY STOPS
62
63
532
533
810
0-60 PSIG
TO ZONE G-4 THIS SHEET
TO ZONES C-1 THIS SHEET
E626
526
808
SET AT 20 PSIG
536
SHOP AIR ILET 501
35 CFM AT 70-125 PSIG 3/4" NPT
510
534
535
762
763
E619
530
811
0-100 PSIG
FROM ZONE G-3 SHEET 4
538
COMPONENT TEST SINK
SINK EXHAUST DUCT 4" DIA
539
E628
809
SET AT 50 PSIG
537
531
E663



1750 RPM
SINK DRAIN
1" NPT
502
RESERVOIR
PRESSURE FILL
3/4" NPT
503
511
543
10
MICRON
540
544
632
FROM ZONE G-7
THIS SHEET
E660
E661
E664
28-475 PPH
630
628
529
E667
310-24700 PPH
627
624
T_4
E644
613
0-1000 P
541
542
SET AT
1/2 FULL
E609
621
814
E641
T_1
598
RESERVOIR
60 GALLON
MIL-C-7024C TYPE II
E618
SET AT
97°F
RESERVOIR
DRAIN
1 1/4" NPT
504
512
599
545
600
601
19000 PPH AT
30 PSIG
602
603
0-100 PSIG
805
604
10 MICRON
594
E612
SET AT
5 PSIG
605
18000 PPH
AT 900 PSIG
606
610
611
608
609
E744
40 HP AT
1750 RPM
546
20 MESH
3 HP AT
3600 RPM
FROM ZONE E-6
THIS SHEET
0-100 PSIG
802
25°-125° F
593
E611
SET AT
10 PSIG
595
0-30 PSIG
VALVE
616
812
WATER INLET
40-70 PSIG
20 GPM AT 70° F
1" NPT
505
590
592
20 MESH
TO ZONE D-2
THIS SHEET
TO ZONE B-5
SHEET 4
596
TC
766
WATER RETURN
1" NPT
506
597
T_5
E645
563
FROM ZONE D-2
THIS SHEET
FROM ZONE B-5
SHEET 4
562
765
587
584
R-502
E629
585
586
DRIP PAN
DRAIN
1" NPT
CONTROL
SECTION
761
5
4



QTY REQD	ITEM NO.	FSCM NO.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE

PARTS LIST

1276001	JOB 9513
NEXT ASS'Y	USED ON

APPLICATION

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
N/A	N/A	

MATERIAL: N/A

FINISH: N/A

SIGNATURES		DATE
DWN	A. GERVASI	4-5-89
CHKR	B.CROWELL	5-23-90
ENGR	J. COLEMAN	3-17-89
QUAL		

BAUER AEROSPACE INC.
FARMINGTON, CT. U.S.A.

J52 FUEL ACCESSORIES TEST STAND

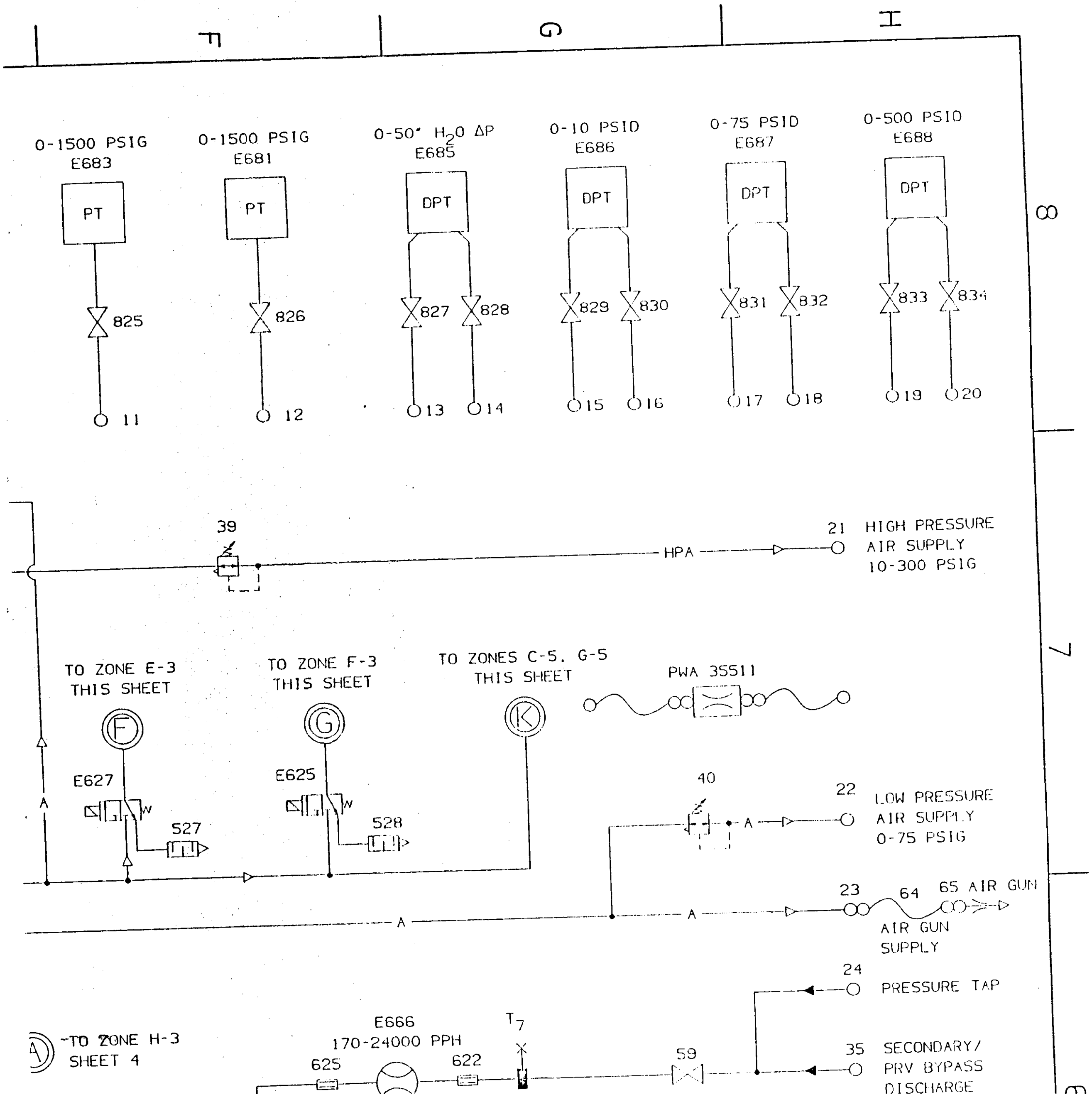
HYDRAULIC SCHEMATIC

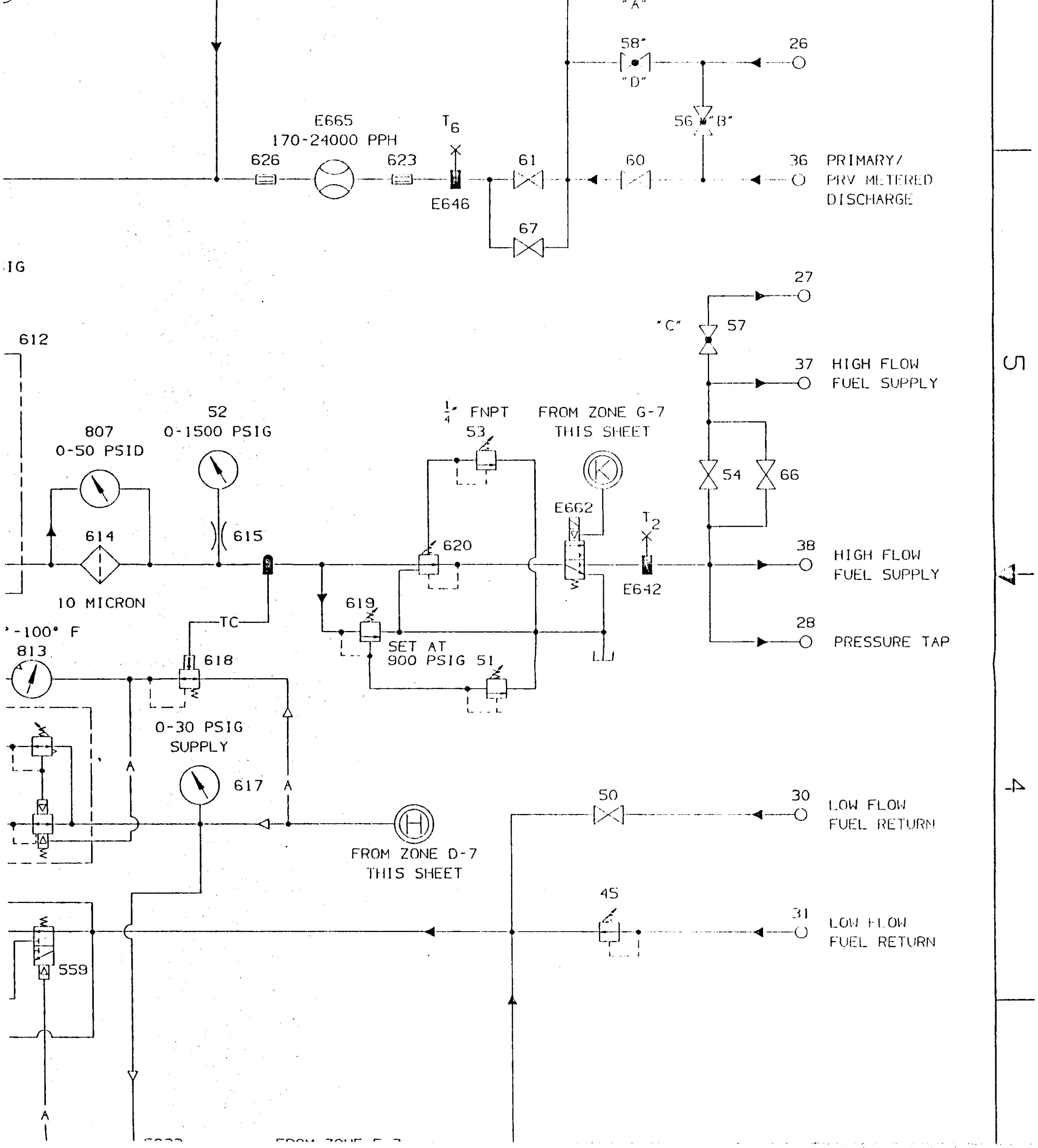
SIZE	FSCM NO.	DWG NO.	REV
E	70882	1276001T	

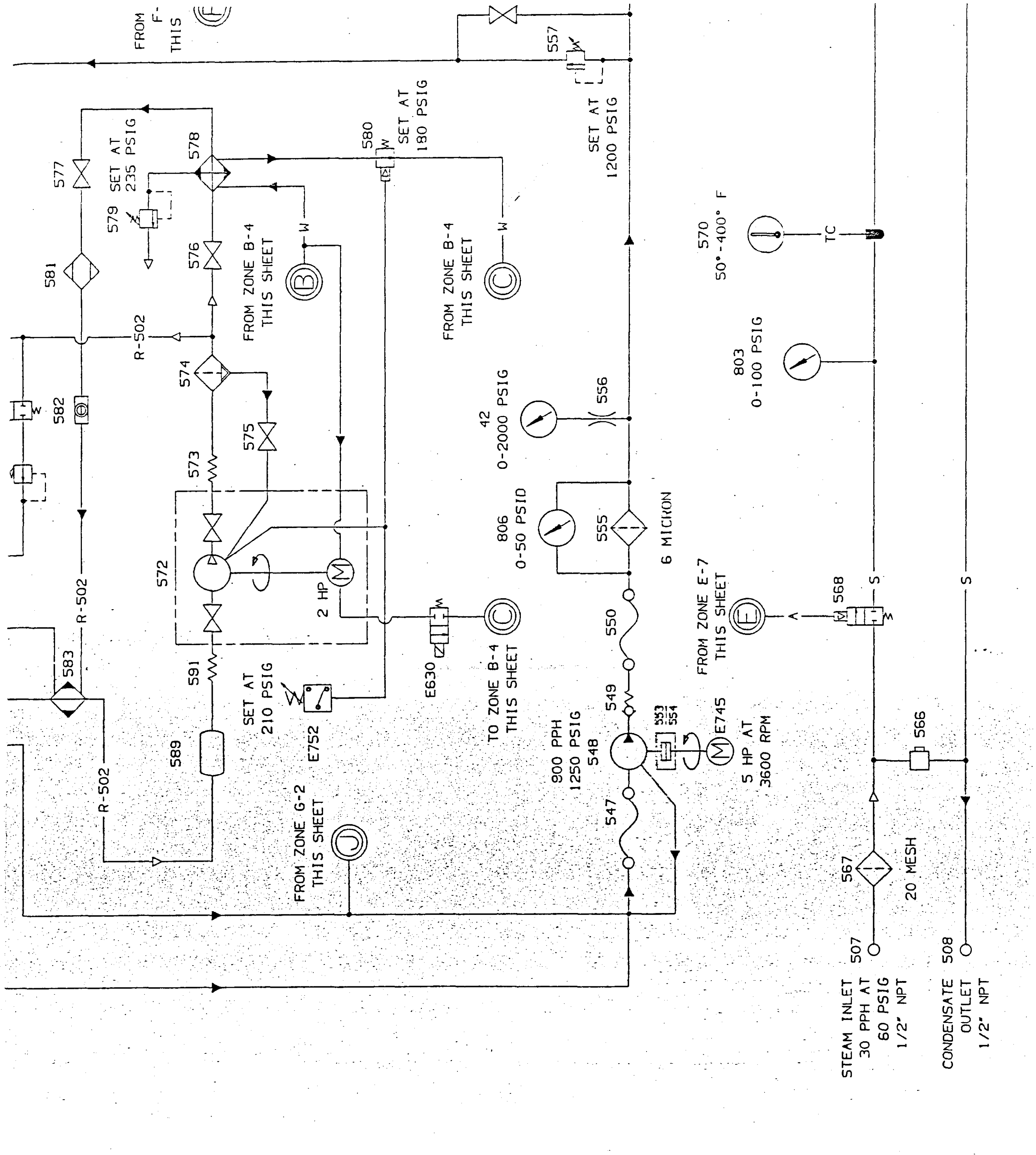
SCALE N/A | WEIGHT N/A | SHEET 3 OF 8

3 2 1

E D C B A


F
G
H
8
7
0-1500 PSIG
E683
PT
825
11
0-1500 PSIG
E681
PT
826
12
0-50" H_2O ΔP
E685
DPT
827
828
13
14
0-10 PSID
E686
DPT
829
830
15
16
0-75 PSID
E687
DPT
831
832
17
18
0-500 PSID
E688
DPT
833
834
19
20
39
HPA
21
HIGH PRESSURE
AIR SUPPLY
10-300 PSIG
TO ZONE E-3
THIS SHEET
TO ZONE F-3
THIS SHEET
TO ZONES C-5, G-5
THIS SHEET
PWA 35511
E627
527
E625
528
40
22
LOW PRESSURE
AIR SUPPLY
0-75 PSIG
A
23
64
65 AIR GUN
AIR GUN
SUPPLY
24
PRESSURE TAP
A
TO ZONE H-3
SHEET 4
E666
170-24000 PPH
625
622
T_7
59
35
SECONDARY/
PRV BYPASS
DISCHARGE


"A"
58"
"D"
26
E665
170-24000 PPH
626
623
T_6
E646
61
60
56 "B"
36 PRIMARY/
PRV METERED
DISCHARGE
67
612
27
"C" 57
37 HIGH FLOW
FUEL SUPPLY
807
0-50 PSID
52
0-1500 PSIG
1/4" FNPT
53
FROM ZONE G-7
THIS SHEET
54
66
614
615
620
E662
T_2
38 HIGH FLOW
FUEL SUPPLY
10 MICRON
619
E642
TC
28 PRESSURE TAP
-100° F
813
618
SET AT
900 PSIG 51
0-30 PSIG
SUPPLY
617
50
30 LOW FLOW
FUEL RETURN
FROM ZONE D-7
THIS SHEET
45
31 LOW FLOW
FUEL RETURN
559
5
4



QTY REQD	ITEM NO.	FSCM NO.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE

PARTS LIST

BAUER AEROSPACE INC.
FARMINGTON, CT. U.S.A.

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
N/A	N/A	

MATERIAL: N/A

FINISH: N/A

SIGNATURES		DATE
DWN	A. GERVASI	4-5-89
CHKR	B. CROWELL	5-23-90
ENGR	J. COLEMAN	3-17-89
QUAL		

J52 FUEL ACCESSORIES TEST STAND

HYDRAULIC SCHEMATIC

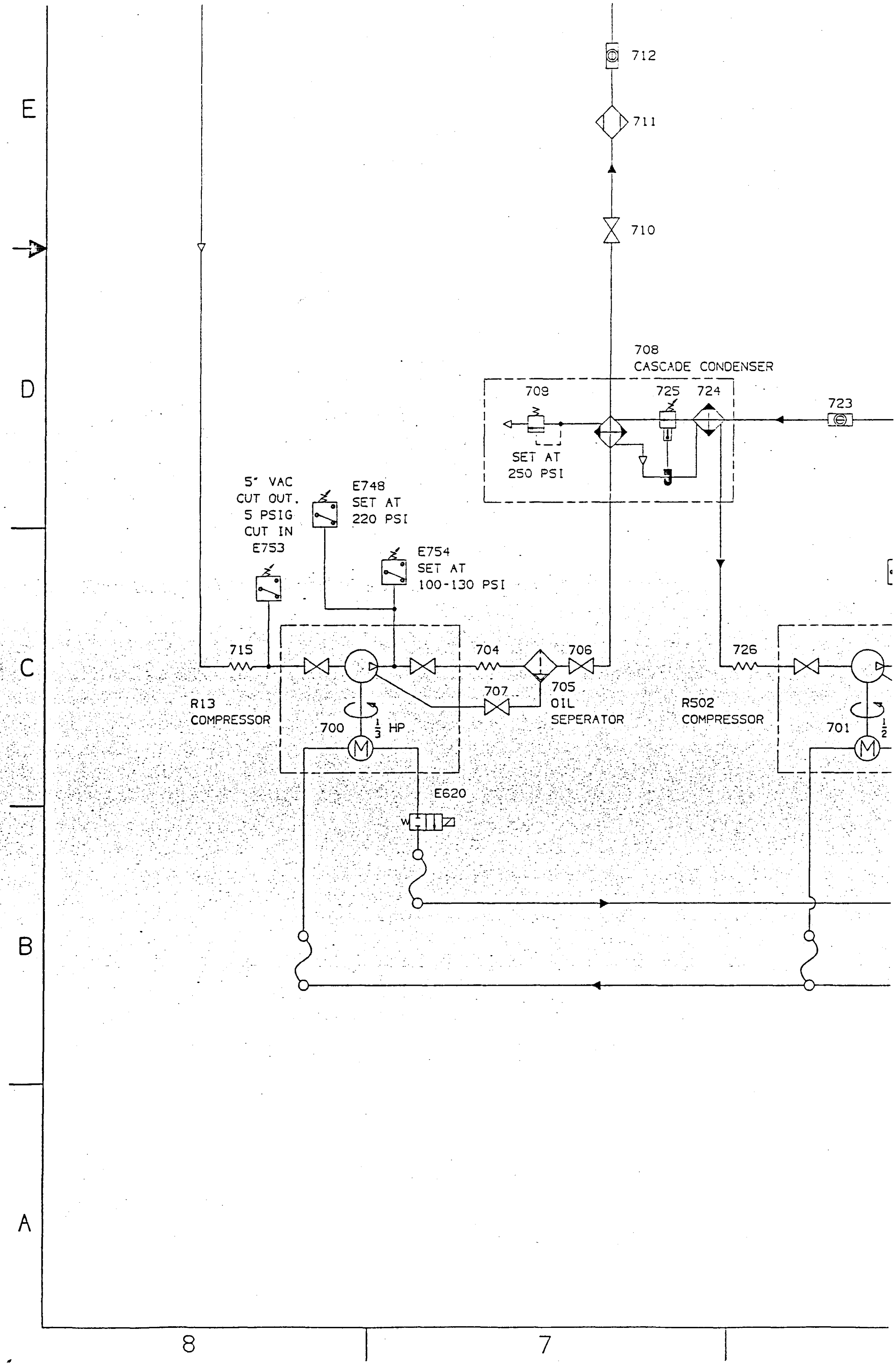
SIZE	FSCM NO.	DWG NO.	REV
E	70882	1276001T	

SCALE N/A | WEIGHT N/A | SHEET 3 OF 8

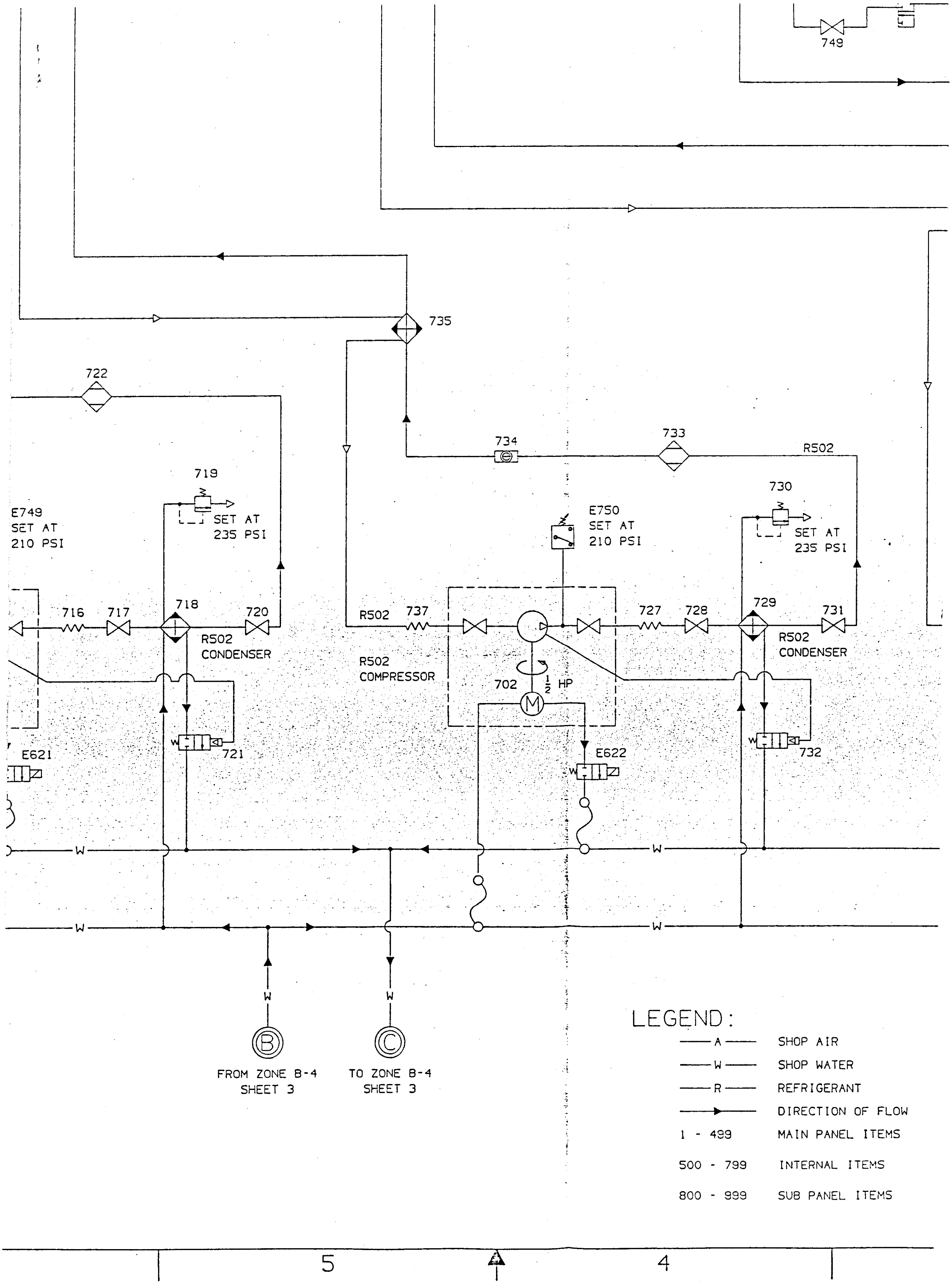
1276001	JOB 9513
NEXT ASS'Y	USED ON
APPLICATION	

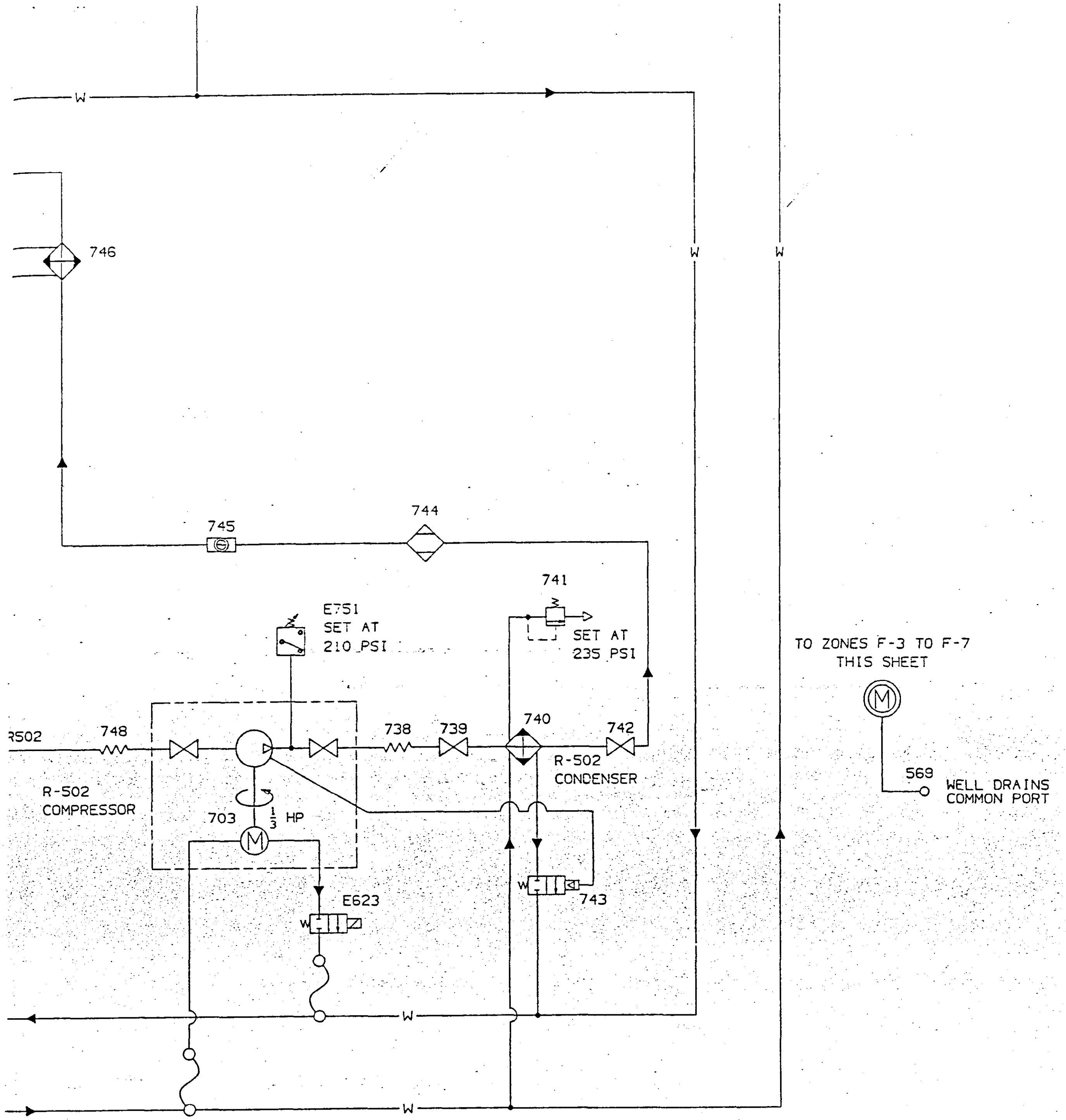
3 2 1

A



712
711
710
708
CASCADE CONDENSER
709
725
724
723
SET AT
250 PSI
5" VAC
CUT OUT.
5 PSIG
CUT IN
E753
E748
SET AT
220 PSI
E754
SET AT
100-130 PSI
715
704
706
726
707
705
OIL
SEPERATOR
R13
COMPRESSOR
700
1/3 HP
R502
COMPRESSOR
701
E620
E
D
C
B
A
8
7


749
735
722
734
733
R502
719
730
E749
SET AT
210 PSI
SET AT
235 PSI
E750
SET AT
210 PSI
SET AT
235 PSI
716
717
718
720
R502
CONDENSER
R502
737
R502
COMPRESSOR
702
$\frac{1}{2}$ HP
727
728
729
731
R502
CONDENSER
E621
721
E622
732
W
W
B
FROM ZONE B-4
SHEET 3
C
TO ZONE B-4
SHEET 3
LEGEND:
A SHOP AIR
W SHOP WATER
R REFRIGERANT
DIRECTION OF FLOW
1 - 499 MAIN PANEL ITEMS
500 - 799 INTERNAL ITEMS
800 - 999 SUB PANEL ITEMS
5
4



E
D
C
B
A
1276001T

QTY REQD	ITEM NO.	FSCM NO.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE

PARTS LIST

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
N/A	N/A	N/A

MATERIAL: N/A

FINISH: N/A

SIGNATURES		DATE
DWN	A. GERVASI	3-14-89
CHKR	B. CROWELL	5-16-90
ENGR	J. COLEMAN	3-14-89
QUAL		

BAUER AEROSPACE INC.
FARMINGTON, CT. U.S.A.

J52 FUEL ACCESSORIES TEST STAND

REFRIGERATION SCHEMATIC

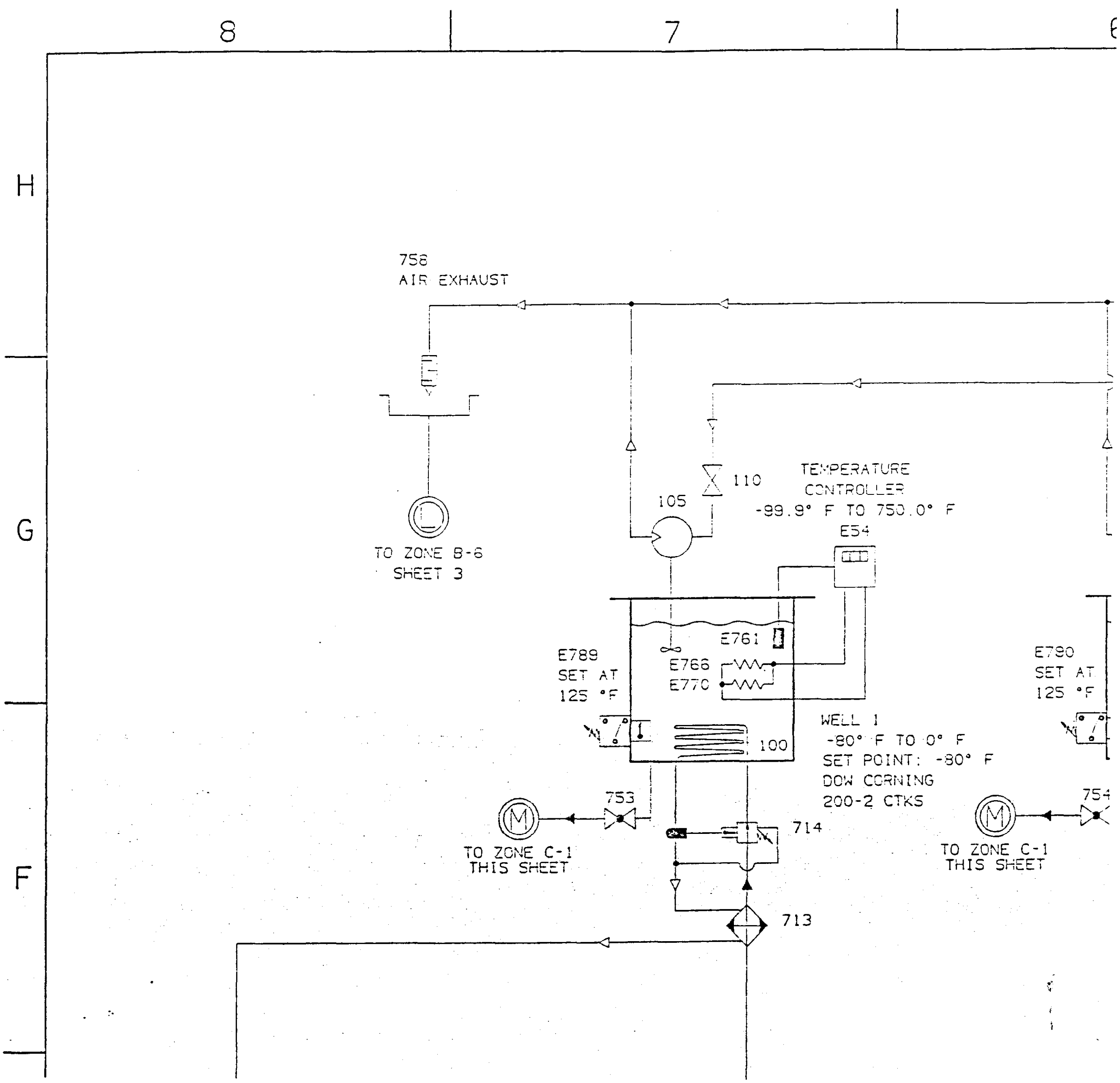
SIZE	FSCM NO.	DWG NO.	REV
E	70882	1276001T	

SCALE N/A | WEIGHT N/A | SHEET 4 OF 8

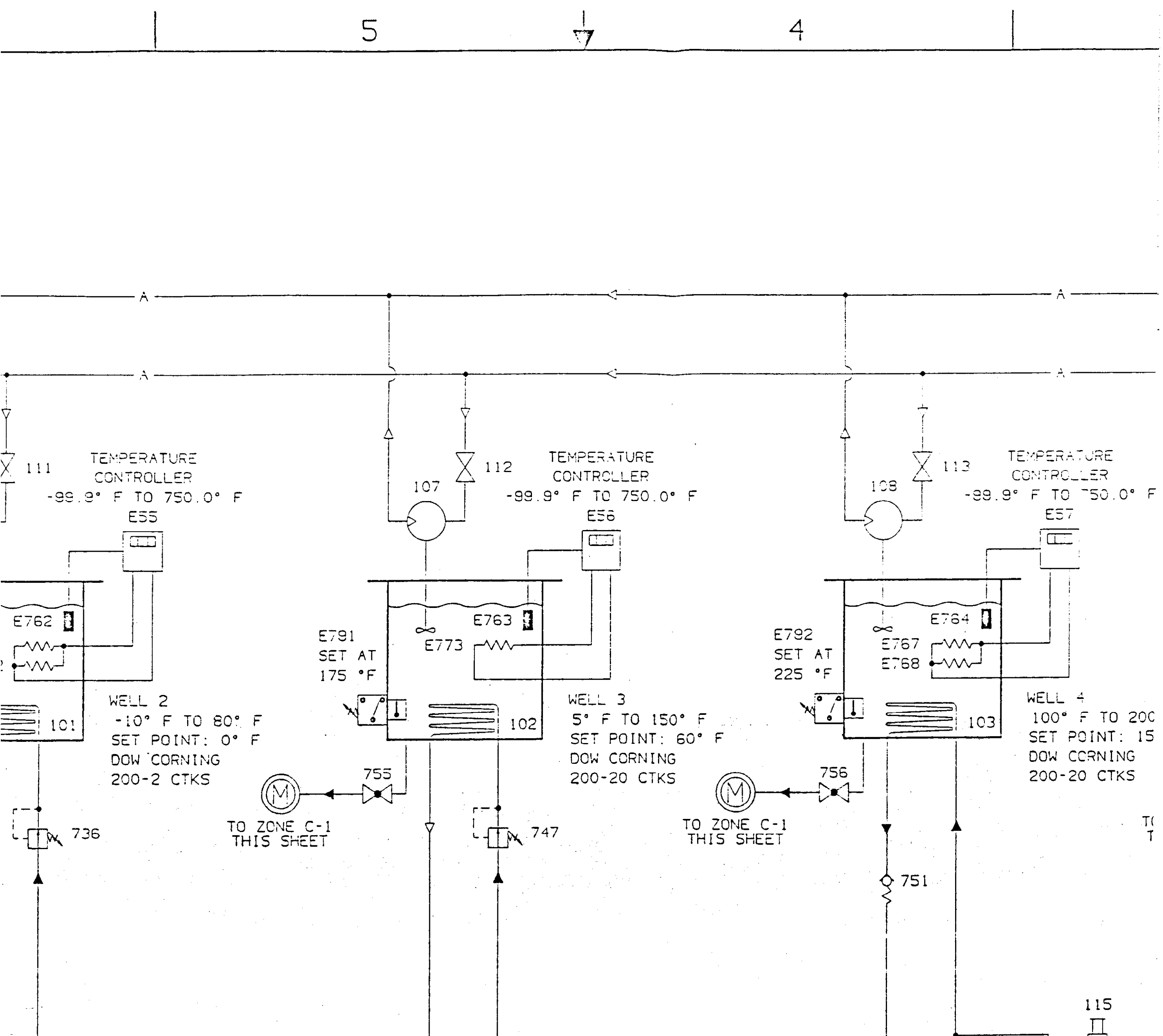
NEXT ASS'Y	USED ON
1276001	JOB 9513

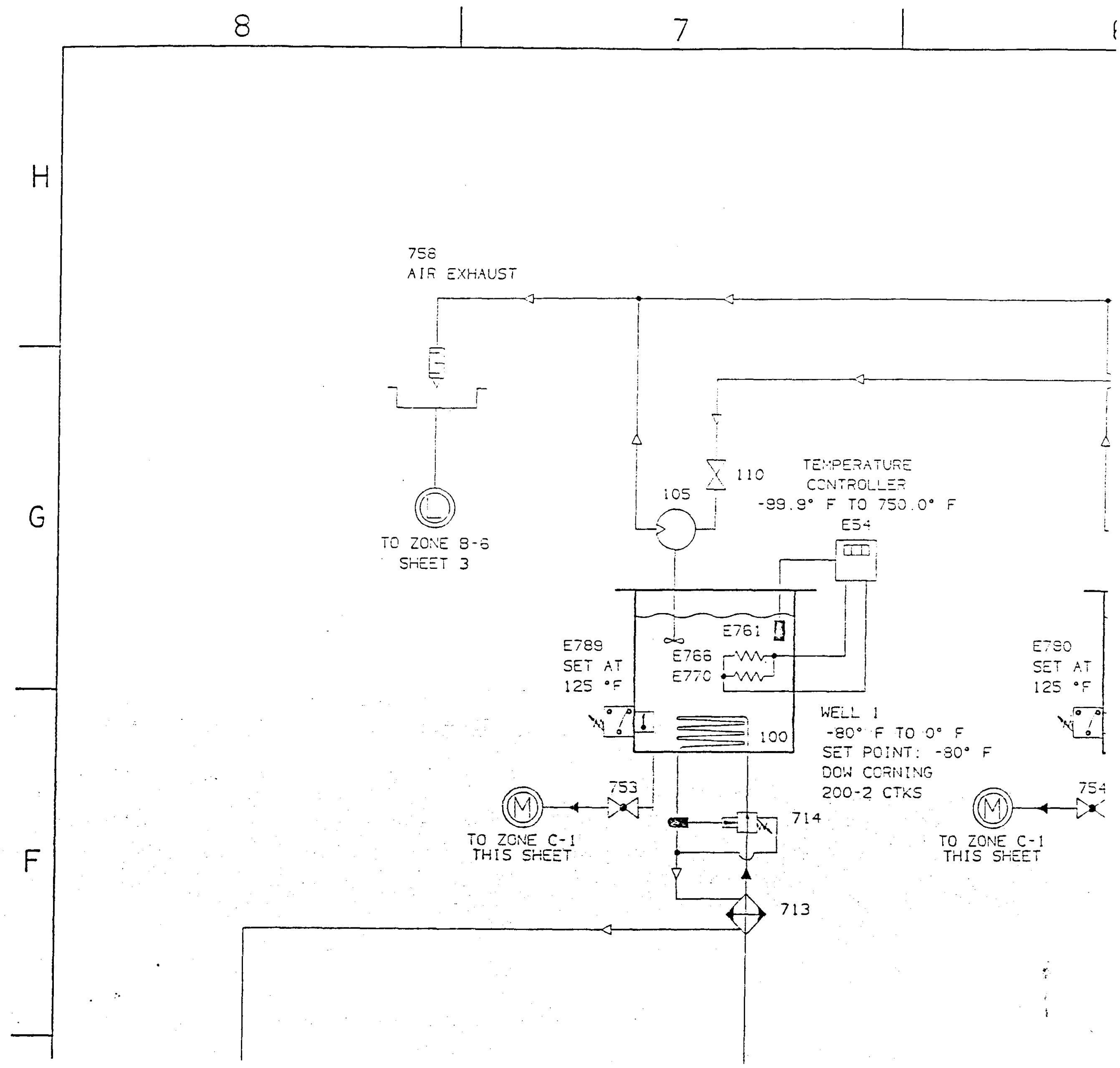
APPLICATION

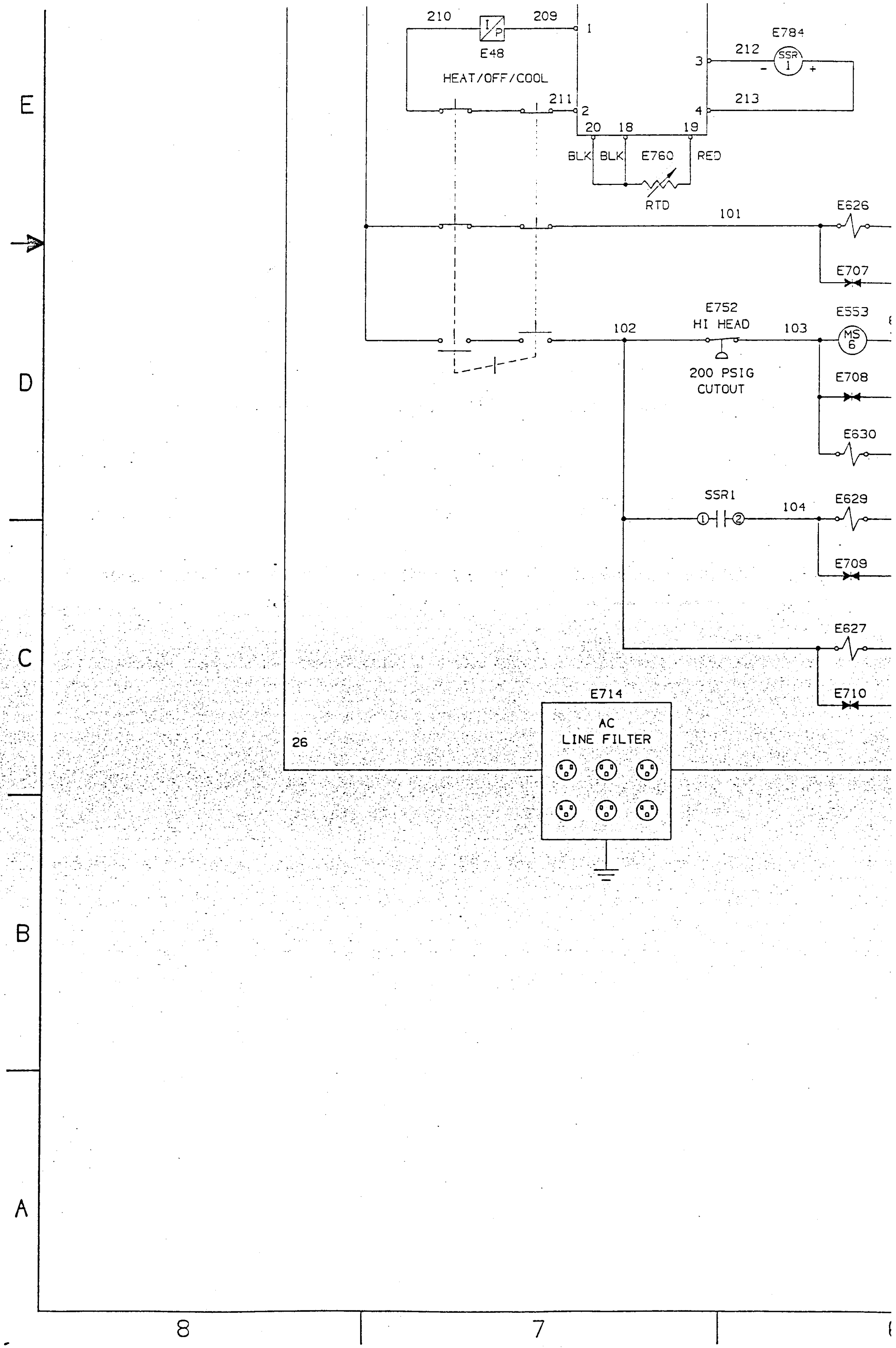
3 2 1



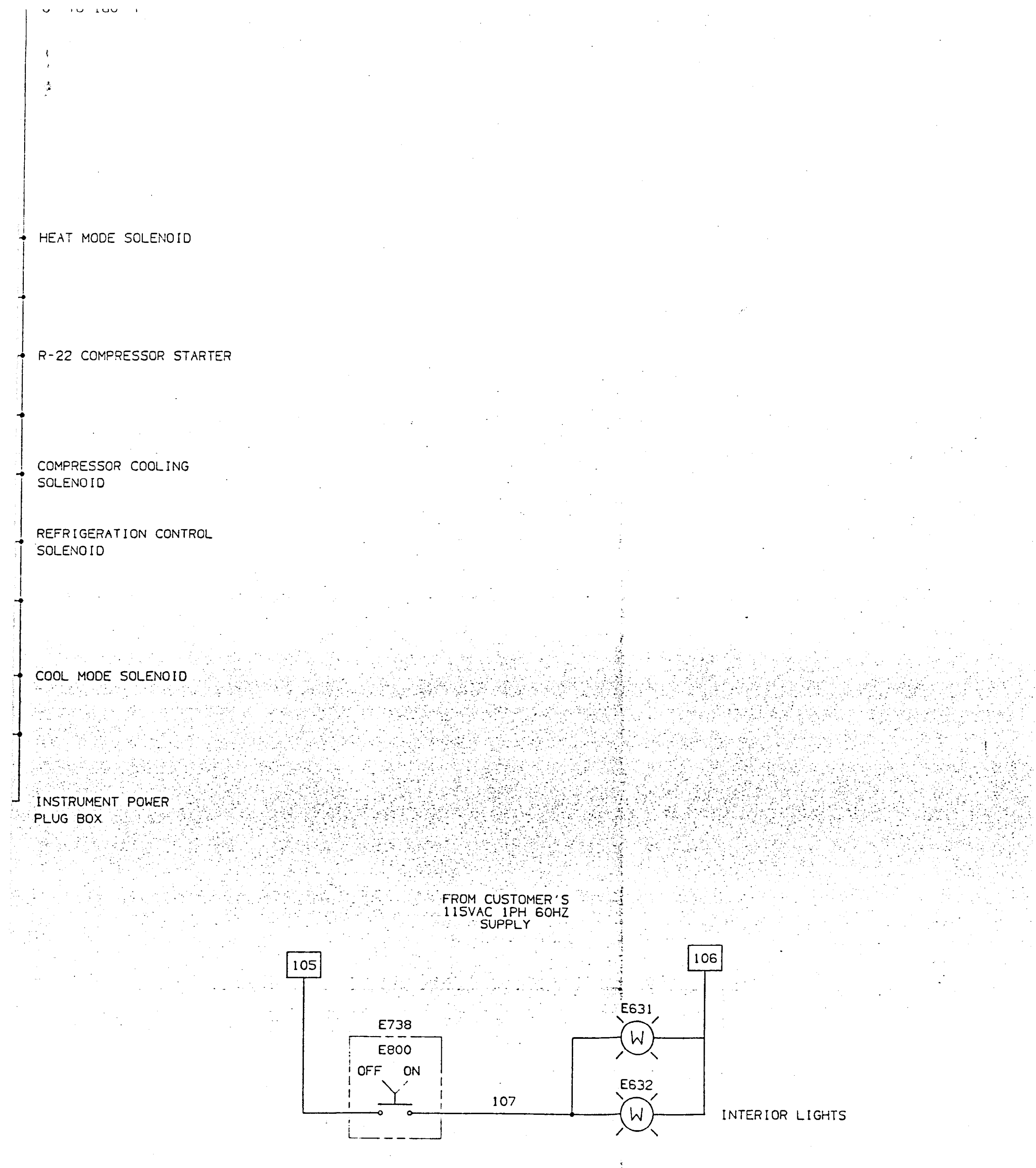
8
7
6
H
G
F
758
AIR EXHAUST
110
TEMPERATURE
CONTROLLER
-99.9° F TO 750.0° F
105
E54
TO ZONE B-6
SHEET 3
E789
SET AT
125 °F
E761
E766
E770
WELL 1
-80° F TO 0° F
SET POINT: -80° F
DOW CORNING
200-2 CTKS
100
E790
SET AT
125 °F
753
714
754
TO ZONE C-1
THIS SHEET
TO ZONE C-1
THIS SHEET
713


5
4
A
111
TEMPERATURE
CONTROLLER
-99.9° F TO 750.0° F
E55
E762
WELL 2
-10° F TO 80° F
SET POINT: 0° F
DOW CORNING
200-2 CTKS
101
736
107
112
TEMPERATURE
CONTROLLER
-99.9° F TO 750.0° F
E56
E791
SET AT
175 °F
E763
E773
102
WELL 3
5° F TO 150° F
SET POINT: 60° F
DOW CORNING
200-20 CTKS
755
TO ZONE C-1
THIS SHEET
747
108
113
E57
E792
SET AT
225 °F
E764
E767
E768
103
WELL 4
100° F TO 200
SET POINT: 15
DOW CORNING
200-20 CTKS
756
TO ZONE C-1
THIS SHEET
751
115


8
7
H
G
F
758
AIR EXHAUST
110
105
TEMPERATURE
CONTROLLER
-99.9° F TO 750.0° F
E54
TO ZONE B-6
SHEET 3
E761
E789
SET AT
125 °F
E766
E770
E790
SET AT
125 °F
WELL 1
-80° F TO 0° F
SET POINT: -80° F
DOW CORNING
200-2 CTKS
100
753
754
714
713
TO ZONE C-1
THIS SHEET
TO ZONE C-1
THIS SHEET



E
D
C
B
A
8
7
210
209
E48
HEAT/OFF/COOL
211
1
2
3
4
E784
212
213
SSR 1
20
18
19
BLK
BLK
E760
RED
RTD
101
E626
E707
E752
HI HEAD
102
103
E553
MS 6
200 PSIG
CUTOUT
E708
E630
SSR1
104
E629
E709
E627
E710
E714
AC
LINE FILTER
26


HEAT MODE SOLENOID
R-22 COMPRESSOR STARTER
COMPRESSOR COOLING SOLENOID
REFRIGERATION CONTROL SOLENOID
COOL MODE SOLENOID
INSTRUMENT POWER PLUG BOX
FROM CUSTOMER'S 115VAC 1PH 60HZ SUPPLY
105
106
E738
E800
OFF
ON
107
E631
W
E632
W
INTERIOR LIGHTS

E

D

C

1276001T

B

QTY REQD	ITEM NO.	FSCM NO.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE

PARTS LIST

1276001	JOB 9513
NEXT ASS'Y	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
N/A	N/A	N/A

MATERIAL: N/A

FINISH: N/A

SIGNATURES		DATE
DWN	A. GERVASI	3-15-90
CHKR	A. M. [illegible]	3-20-90
ENGR/	J. KUCZENSKI	3-15-89
QUAL		

BAUER AEROSPACE INC.
FARMINGTON, CT. U.S.A.

J52 FUEL ACCESSORIES TEST STAND

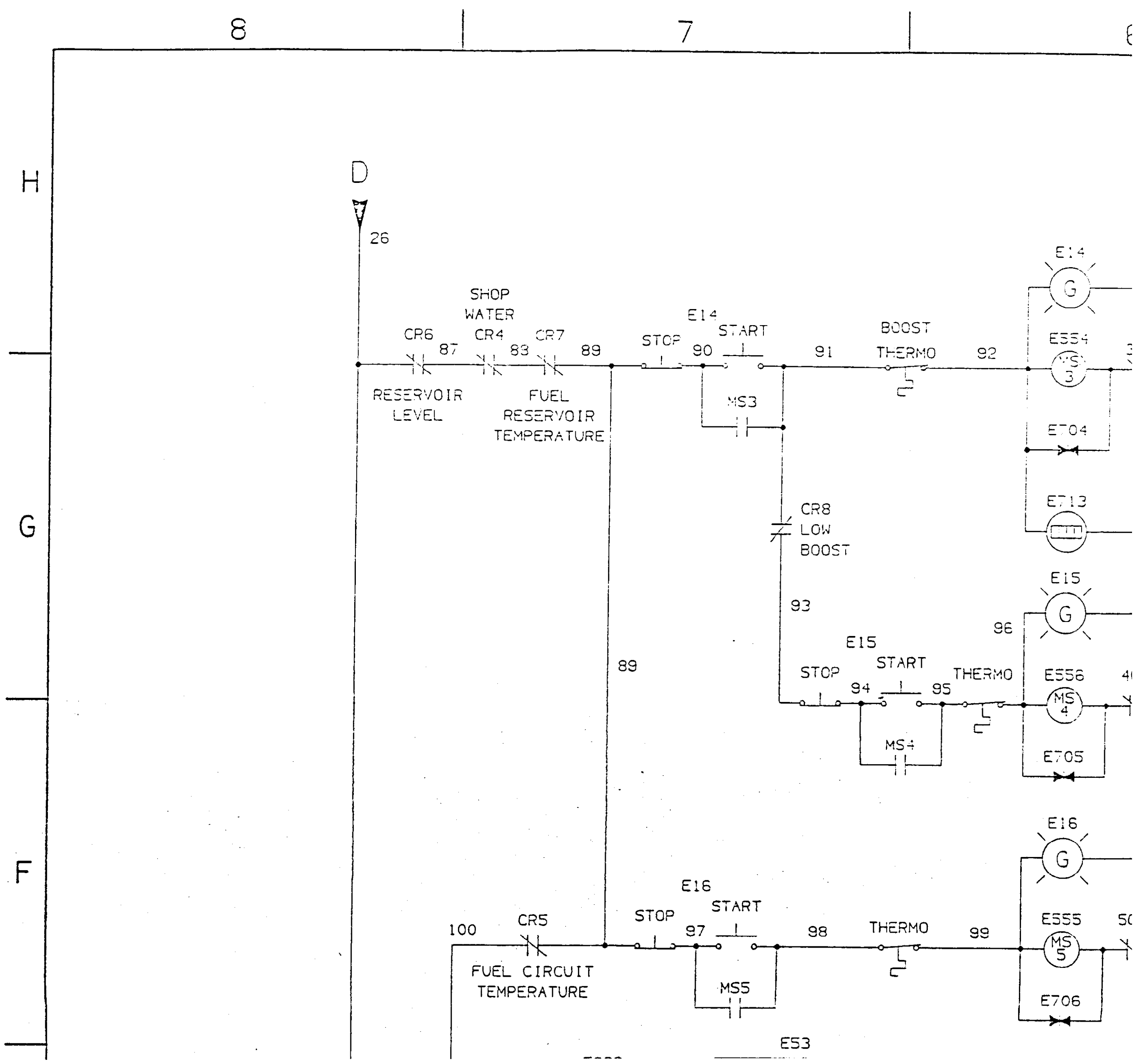
ELECTRICAL SCHEMATIC

SIZE	FSCM NO.	DWG NO.	REV
E	70882	1276001T	

SCALE N/A | WEIGHT N/A | SHEET 6 OF 8

A

3 2 1



8
7
H
G
F
D
26
SHOP
WATER
CR6
87
CR4
83
CR7
89
RESERVOIR
LEVEL
FUEL
RESERVOIR
TEMPERATURE
STOP
E14
90
START
91
MS3
BOOST
THERMO
92
E14
E554
E704
E713
CR8
LOW
BOOST
93
89
E15
96
E15
STOP
94
START
95
THERMO
E556
MS4
E705
E16
E16
STOP
97
START
98
THERMO
99
E555
100
CR5
FUEL CIRCUIT
TEMPERATURE
MS5
E706
E53

5

4

HIGH FLOW FUEL SUPPLY
BOOST PUMP "ON"

BOOST PUMP STARTER

ELAPSED TIME METER

HIGH FLOW
HIGH PRESSURE PUMP "ON"

HIGH FLOW
HIGH PRESSURE
PUMP STARTER

LOW FLOW
HIGH PRESSURE PUMP "ON"

LOW FLOW
HIGH PRESSURE
PUMP STARTER

FUEL CIRCUIT

3 2 1

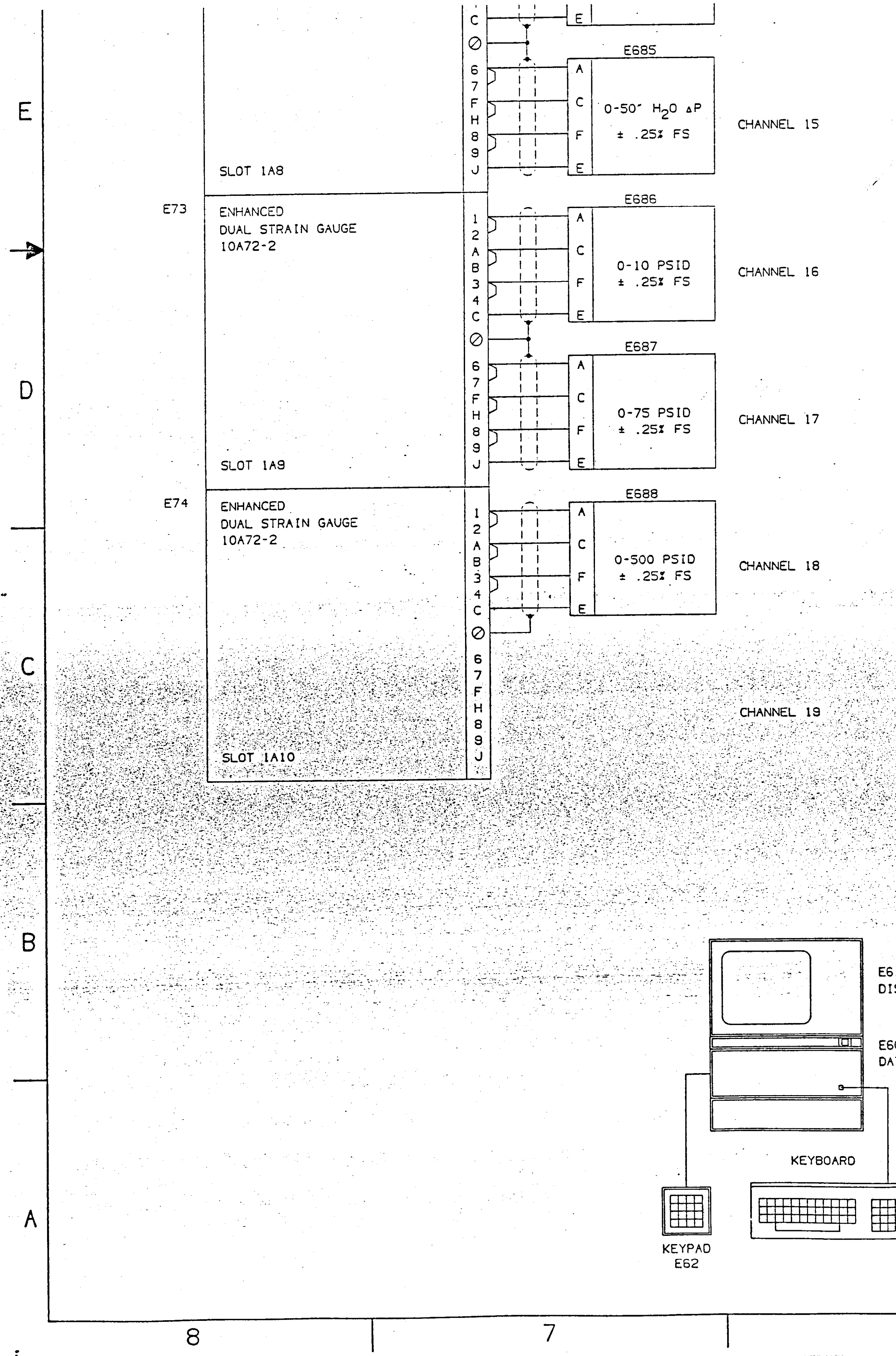
REVISIONS

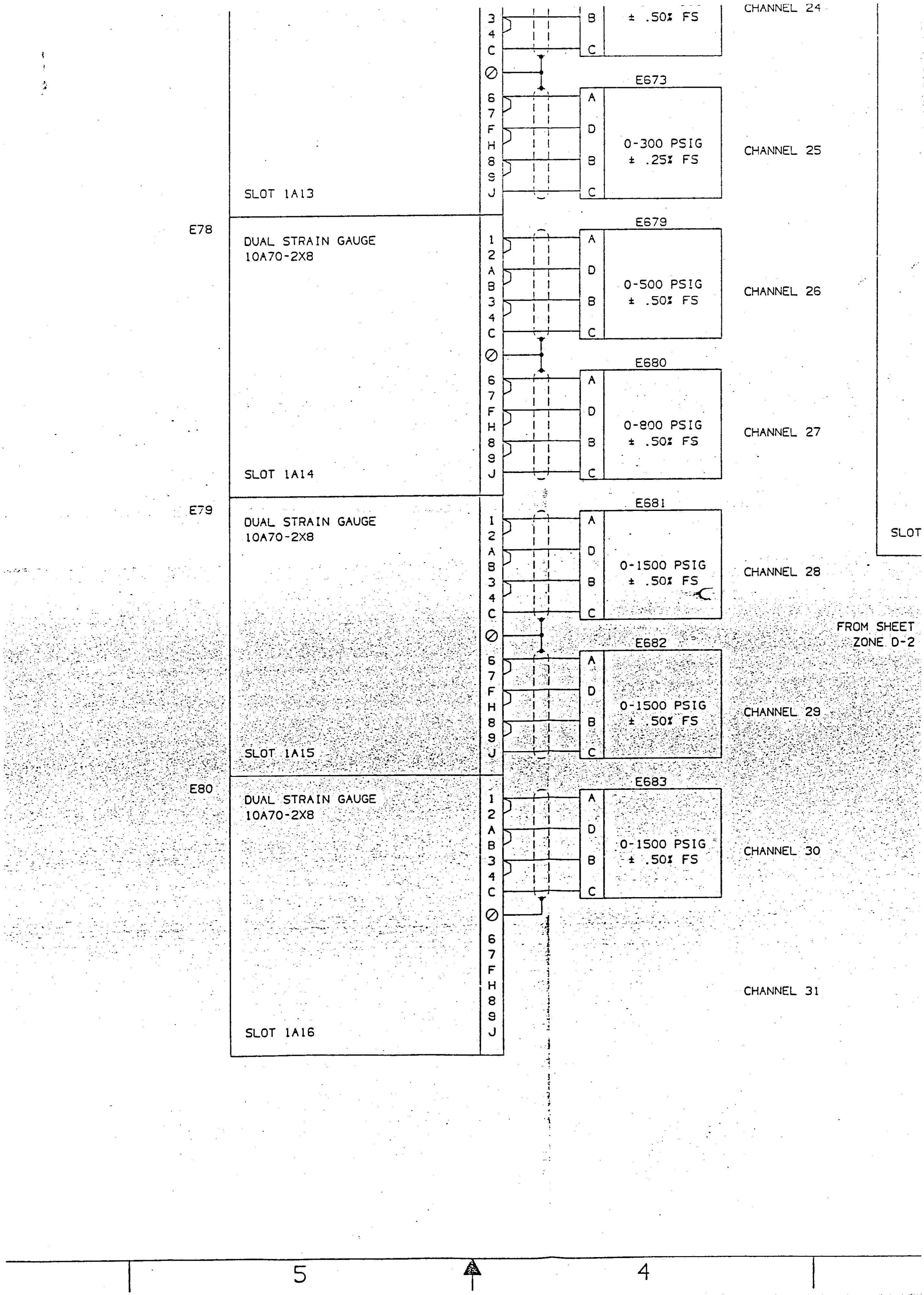
ZONE	LTR	DESCRIPTION	DATE	APPROVED

H

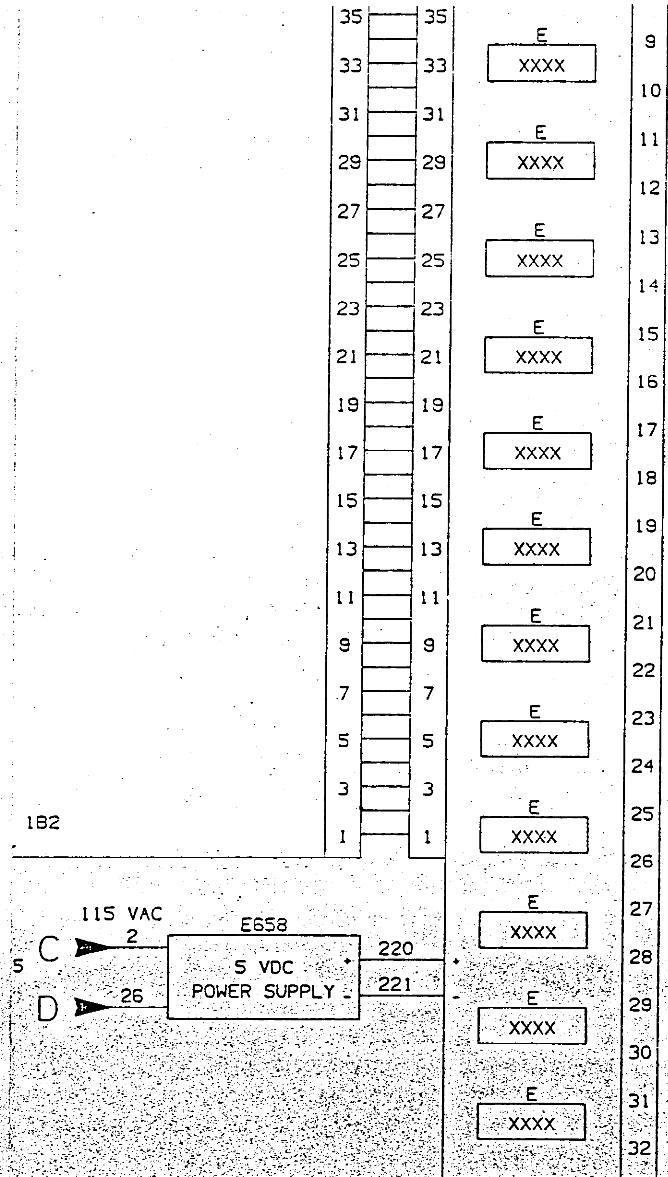
G

F


E685
0-50" H_2O ΔP
± .25% FS
CHANNEL 15
SLOT 1A8
E73
ENHANCED
DUAL STRAIN GAUGE
10A72-2
E686
0-10 PSID
± .25% FS
CHANNEL 16
E687
0-75 PSID
± .25% FS
CHANNEL 17
SLOT 1A9
E74
ENHANCED
DUAL STRAIN GAUGE
10A72-2
E688
0-500 PSID
± .25% FS
CHANNEL 18
CHANNEL 19
SLOT 1A10
KEYBOARD
KEYPAD
E62
E
D
C
B
A
8
7



CHANNEL 24
± .50% FS
E673
0-300 PSIG
± .25% FS
CHANNEL 25
SLOT 1A13
E78
DUAL STRAIN GAUGE
10A70-2X8
E679
0-500 PSIG
± .50% FS
CHANNEL 26
E680
0-800 PSIG
± .50% FS
CHANNEL 27
SLOT 1A14
E79
DUAL STRAIN GAUGE
10A70-2X8
E681
0-1500 PSIG
± .50% FS
CHANNEL 28
SLOT
FROM SHEET
ZONE D-2
E682
0-1500 PSIG
± .50% FS
CHANNEL 29
SLOT 1A15
E80
DUAL STRAIN GAUGE
10A70-2X8
E683
0-1500 PSIG
± .50% FS
CHANNEL 30
CHANNEL 31
SLOT 1A16
5
4



E
D
C
B
A

1276001T

QTY REQD	ITEM NO.	FSCM NO.	PART NO. OR IDENTIFYING NO.	NOMENCLATURE OR DESCRIPTION	MATERIAL OR NOTE

PARTS LIST

1276001	JOB 9513
NEXT ASS'Y	USED ON
APPLICATION	

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES
TOLERANCES ON

FRACTIONS	DECIMALS	ANGLES
N/A	N/A	N/A

MATERIAL: N/A

FINISH: N/A

SIGNATURES		DATE
DWN	A. GERVASI	3-15-90
CHKR	[signature]	5-23-90
ENGR	J. KUCZENSKI	3-15-89
QUAL		

BAUER AEROSPACE INC.
FARMINGTON, CT. U.S.A.

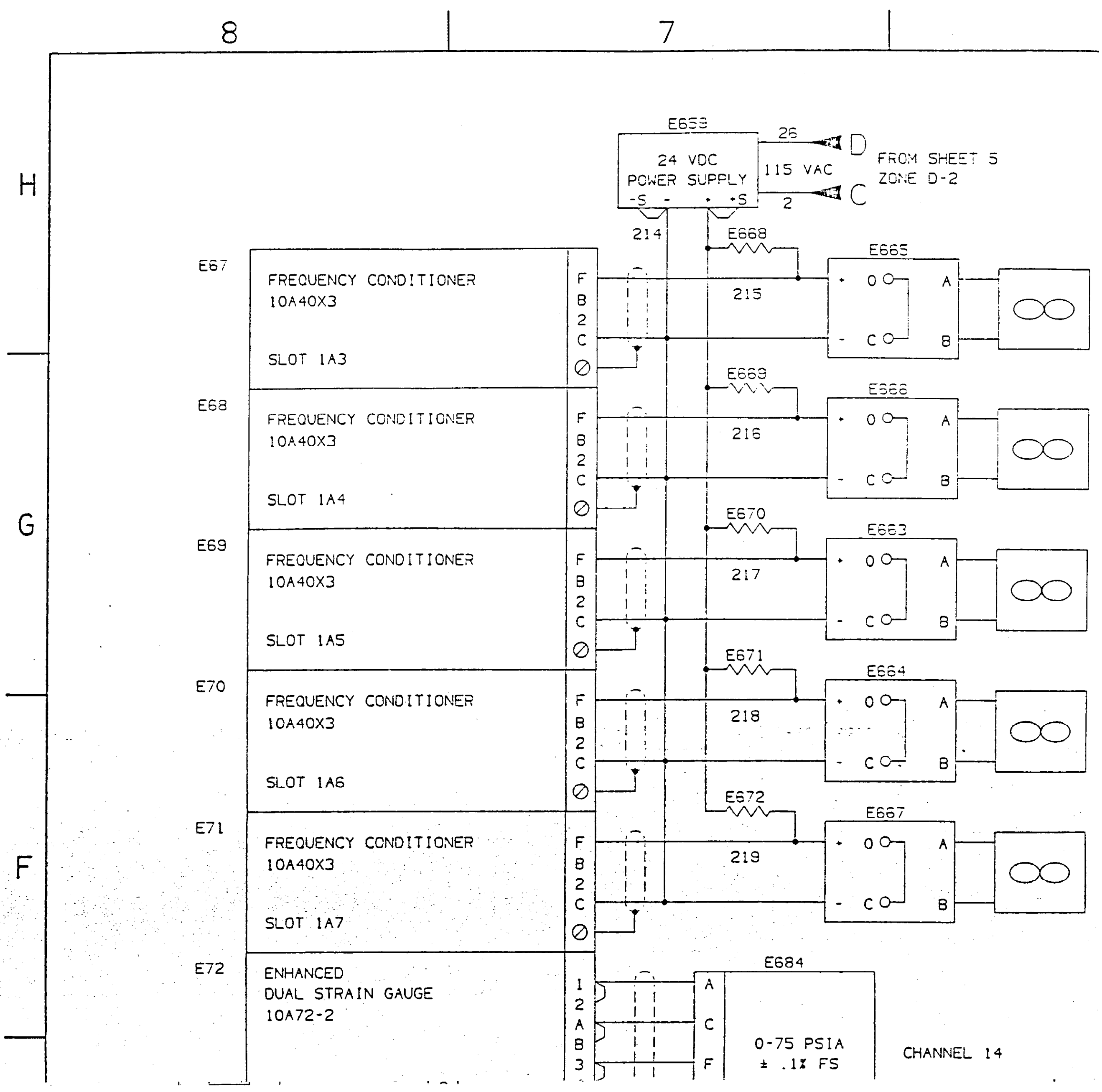
J52 FUEL ACCESSORIES TEST STAND

ELECTRICAL SCHEMATIC

SIZE	FSCM NO.	DWG NO.	REV
E	70882	1276001T	

SCALE N/A | WEIGHT N/A | SHEET 7 OF 8

3 2 1



8
7
H
G
F
E659
24 VDC
POWER SUPPLY
-S - + +S
26
115 VAC
2
D
C
FROM SHEET 5
ZONE D-2
214
E67
FREQUENCY CONDITIONER
10A40X3
SLOT 1A3
E668
215
E665
E68
FREQUENCY CONDITIONER
10A40X3
SLOT 1A4
E669
216
E666
E69
FREQUENCY CONDITIONER
10A40X3
SLOT 1A5
E670
217
E663
E70
FREQUENCY CONDITIONER
10A40X3
SLOT 1A6
E671
218
E664
E71
FREQUENCY CONDITIONER
10A40X3
SLOT 1A7
E672
219
E667
E72
ENHANCED
DUAL STRAIN GAUGE
10A72-2
E684
0-75 PSIA
± .1% FS
CHANNEL 14